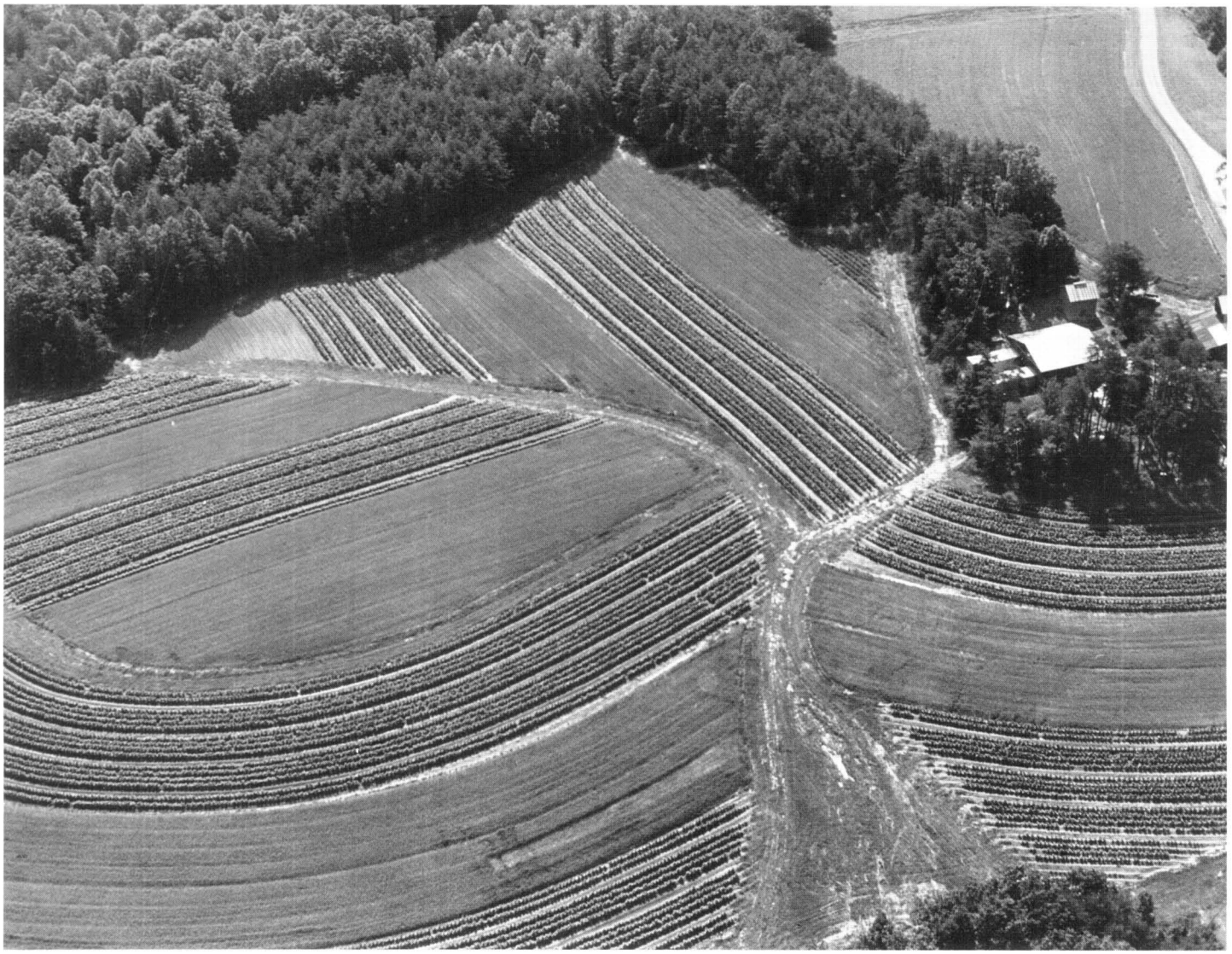
United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
North Carolina
Department of
Environment, Health, and
Natural Resources; North
Carolina Agricultural
Research Service; North
Carolina Agricultural
Extension Service; and
Rockingham County
Board of Commissioners

Soil Survey of Rockingham County, North Carolina



How To Use This Soil Survey

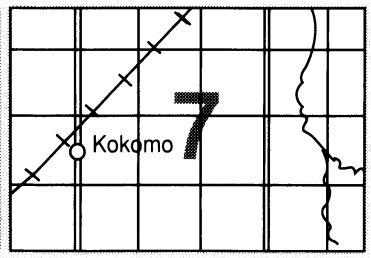
General Soil Map

The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

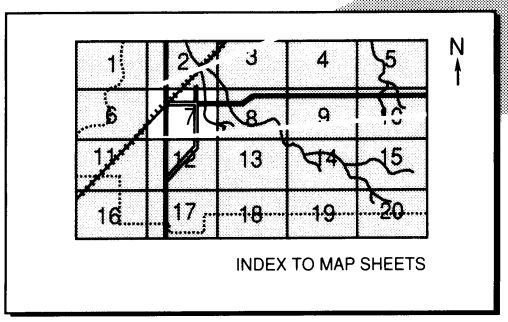
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.



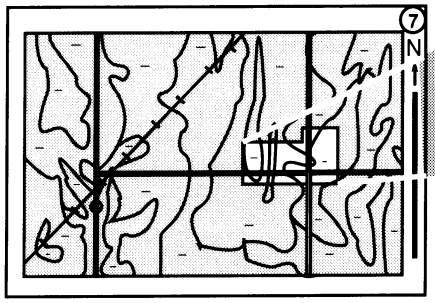
MAP SHEET

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.

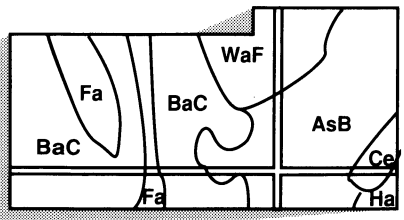


INDEX TO MAP SHEETS

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



MAP SHEET



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the North Carolina Agricultural Research Service, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1982. Soil names and descriptions were approved in 1983. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1982. This soil survey was made cooperatively by the Soil Conservation Service; the North Carolina Department of Environment, Health, and Natural Resources; the North Carolina Agricultural Research Service; the North Carolina Agricultural Extension Service; and the Rockingham County Board of Commissioners. It is part of the technical assistance furnished to the Rockingham County Soil and Water Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

The first soil survey of Rockingham County was published in 1926. This survey updates the first soil survey and provides additional information.

All programs and services of the Soil Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: Contour stripcropping and grassed waterways in an area of Appling soils.

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Issued February 1992

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ApD—Appling sandy loam, 8 to 15 percent slopes. 15
AyC—Ayersville gravelly loam, 4 to 15 percent slopes. 15
AyF—Ayersville gravelly loam, 15 to 45 percent slopes. 15
CcB—Cecil sandy loam, 2 to 8 percent slopes 16
CdB2—Cecil sandy clay loam, 2 to 8 percent slopes, eroded 16
CeC—Cecil-Urban land complex, 2 to 10 percent slopes. 17
Ch—Chastain silty clay loam 17
Ck—Chewacla loam. 18
Co—Congaree loam. 18
CrB—Creedmoor fine sandy loam, 1 to 4 percent slopes. 19
DoB—Dogue loam, 0 to 4 percent slopes. 20
HeB—Helena sandy loam, 2 to 8 percent slopes. 20
HwB—Hiwassee loam, 2 to 8 percent slopes 21
HwD—Hiwassee loam, 8 to 15 percent slopes 21
IrB—Iredell fine sandy loam, 2 to 8 percent slopes. 22
IrD—Iredell fine sandy loam, 8 to 15 percent slopes. 22
LeB—Leaksville silt loam, 0 to 4 percent slopes. 23
LkB—Leaksville-Urban land complex, 0 to 4 percent slopes 23
MaD—Madison sandy loam, 8 to 15 percent slopes. 23
MaE—Madison sandy loam, 15 to 35 percent slopes. 24
MbB2—Madison sandy clay loam, 2 to 8 percent slopes, eroded 24
MbD2—Madison sandy clay loam, 8 to 15 percent slopes, eroded 25
MbE2—Madison sandy clay loam, 15 to 25 percent slopes, eroded 25
McC2—Madison-Udorthents complex, 2 to 15 percent slopes, gullied 26
MdB—Mayodan sandy loam, 2 to 8 percent slopes. 26
MdD—Mayodan sandy loam, 8 to 15 percent slopes. 27
MdE—Mayodan sandy loam, 15 to 25 percent slopes. 27
MeB2—Mayodan sandy clay loam, 2 to 8 percent slopes, eroded 27
MeD2—Mayodan sandy clay loam, 8 to 15 percent slopes, eroded 28
MeE2—Mayodan sandy clay loam, 15 to 25 percent slopes, eroded 29
MfC—Mayodan-Urban land complex, 2 to 10 percent slopes 29
MkB2—Mecklenburg sandy clay loam, 2 to 8 percent slopes, eroded 29
PaD—Pacolet sandy loam, 8 to 15 percent slopes. 30
PaE—Pacolet sandy loam, 15 to 25 percent slopes. 30
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PcD2—Pacolet sandy clay loam, 8 to 15 percent slopes, eroded 31
PcE2—Pacolet sandy clay loam, 15 to 25 percent slopes, eroded 32
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PnF—Pinkston fine sandy loam, 15 to 45 percent slopes. 33
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Qu—Pits, quarries 33
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RnD—Rion sandy loam, 8 to 15 percent slopes 34
RnE—Rion sandy loam, 15 to 30 percent slopes. 35
RoC—Rion-Urban land complex, 2 to 10 percent slopes. 35

SeB—Sedgefield sandy loam, 2 to 8 percent slopes. 35
SpB—Spray loam, 0 to 5 percent slopes 36
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SvB—Stoneville loam, 2 to 8 percent slopes 37
SvD—Stoneville loam, 8 to 15 percent slopes. 38
SvE—Stoneville loam, 15 to 25 percent slopes. 38
SwC—Stoneville-Urban land complex, 2 to 10 percent slopes 39
Ud—Udorthents, loamy 39
Ur—Urban land 39
VaB—Vance sandy loam, 2 to 8 percent slopes. 39
VaD—Vance sandy loam, 8 to 15 percent slopes. 40
WaD—Wateree fine sandy loam, 6 to 15 percent slopes. 40
WaF—Wateree fine sandy loam, 15 to 45 percent slopes. 41
We—Wehadkee silt loam 41
WhB—Wickham sandy loam, 1 to 4 percent slopes. 42
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Foreword

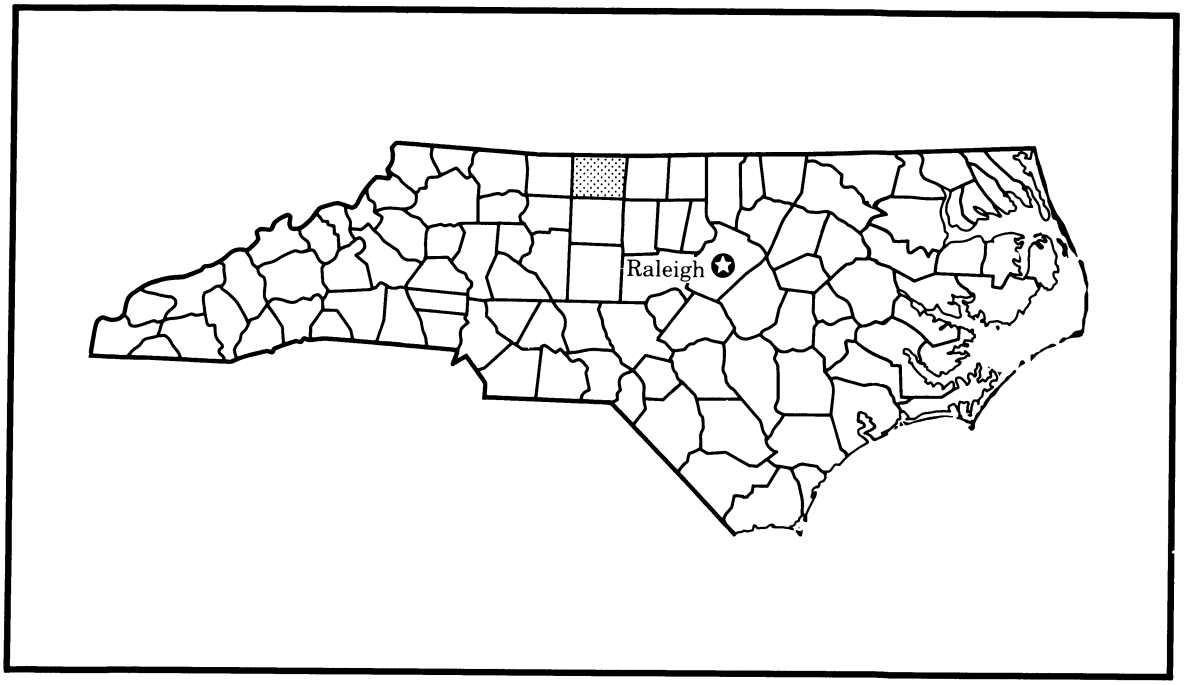
This soil survey contains information that can be used in land-planning programs in Rockingham County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the North Carolina Agricultural Extension Service.

Bobbye J. Jones
State Conservationist
Soil Conservation Service



Location of Rockingham County in North Carolina.

Soil Survey of Rockingham County, North Carolina

By Michael L. Sherrill, Soil Conservation Service

Soils surveyed by Michael L. Sherrill, Michael K. Kimbro, Charles Wilkinson, and Charles Anderson, Soil Conservation Service, and Perry W. Wyatt and Robert M. Brown, North Carolina Department of Environment, Health, and Natural Resources

United States Department of Agriculture, Soil Conservation Service, in cooperation with North Carolina Department of Environment, Health, and Natural Resources; North Carolina Agricultural Research Service; North Carolina Agricultural Extension Service; and Rockingham County Board of Commissioners

ROCKINGHAM COUNTY is in the north-central part of North Carolina, about 65 miles northwest of Raleigh, the capital of the state. The county is in the Piedmont physiographic province. It is bounded on the north by Henry and Pittsylvania Counties, Virginia; on the west by Stokes County; on the east by Caswell and Alamance Counties; and on the south by Guilford County. The area of the county is 572 square miles, or 366,080 acres.

General Nature of the Survey Area

This section gives general information about the history, industry and transportation facilities, water supply, land use, and climate of Rockingham County.

History

Settlement of the area now known as Rockingham County began in the 1760's. The early settlers came to the western part of Rockingham County to escape religious and political tyranny.

An act in 1785 of the General Assembly of North Carolina formed Rockingham County from part of Guilford County. The county was named in honor of Charles Watson Wentworth, the Marquis of Rockingham, for his support of the American Colonies.

During the American Revolution, General Nathanael Greene and the Revolutionary Army camped at Troublesome Creek Iron Works Mills en route to fight Cornwallis at Guilford Courthouse.

After the Revolutionary War, tobacco became a major cash crop. The first tobacco factory in Reidsville was located on present-day Scales Street in 1858. Since then, tobacco manufacturing has been important in the economy of Rockingham County *(6)*.

Industry and Transportation Facilities

Four U.S. highways, several major state roads, two railroad lines, the Greensboro Regional Airport, and several trucking firms serve Rockingham County.

According to the Reidsville Chamber of Commerce, manufacturing industries employ about 50 percent of the total work force in Rockingham County. The largest industries manufacture textiles, brewery products, and tobacco. Other important sources of employment include industries that manufacture blow-molded plastic products, furniture, telecommunications cable, building materials, and temperature-control products.

Eden is the location of many industries. The largest employer is the textile mills. In addition, a major brewery was established in Eden, largely because of the abundant supply of clean water from the Dan River.

Reidsville has long been the largest tobacco-processing center in Rockingham County. Its factories manufacture cigarettes and packaging materials for national distribution. Also, manufacturers of textiles and blow-molded plastic products employ many workers.

Madison, Mayodan, and Stoneville also are industrial centers. Madison and Mayodan mainly produce textiles, and Stoneville is noted for its furniture.

Water Supply

Rockingham County has an abundant supply of water from both surface streams and ground water.

The wells in Rockingham County are dug, bored, or drilled. Dug wells range in depth from a few feet to nearly 100 feet. The inside diameter generally is 24 to 30 inches. These wells have a larger storage capacity than other types, but digging below the water table and through bedrock is difficult. In the shallower dug wells, contamination is a hazard.

In bored wells, which are very similar to dug wells, a large machine-operated auger removes the earth. Bored wells generally range from 30 to 40 feet in depth and from 18 to 24 inches in diameter. These wells can be easily bored to a considerable depth below the water table and thus are not likely to go dry during periods of drought. They cannot be used, however, where the water table is below a zone of completely decayed and disintegrated rock.

Drilled wells are safer and more reliable than dug and bored wells. They are tightly cased and obtain water from crevices in the bedrock. As a result, the danger of contamination is limited. Drilled wells generally extend far below the fluctuating water table and thus rarely go dry.

A drilled well that is 3 inches or more in diameter yields the most water in greenstone schist bedrock *(7)*. Greenstone schist has an average yield of 28 gallons per minute. Wells in sheared granite rank second in average yield. They yield an average of 14 gallons per minute. Next in order of greatest average yield are gneiss, sericite schist, porphyritic granite, and Triassic sedimentary rocks. The average yield of drilled wells is 17 gallons per minute, but it tends to decrease over time.

Topographic location is important in locating a well. The highest yield is generally from wells in valleys, where the average yield is 28 gallons per minute from a drilled well 3 inches or more in diameter. The next highest average yield, 27 gallons per minute, is from wells in draws. Next in order of yields are flats, slopes, and hills.

Many cities and industries in Rockingham County obtain their water from sources other than wells. Reidsville obtains its water from Lake Reidsville and Lake Hunt, which have a combined capacity of 2.4 million gallons. The cities of Eden and Madison obtain their water from the Dan River. Mayodan obtains its water from the Mayo River. Other towns in Rockingham County obtain their water from wells.

The approximately 2,500 manmade ponds and lakes in the county are used chiefly for irrigation, livestock water, recreation, fire protection, and flood prevention.

Land Use

According to the Census of Agriculture, Rockingham County had 63,694 acres of cropland and 12,656 acres of pasture and hayland in 1978. According to the North Carolina Conservation Needs Inventory, 15,981 acres was urban or built-up areas in 1971; 233,898 acres was woodland; and 15,222 acres was used for other purposes. Each year more land is used as woodland or as urban areas and less as pasture and cropland.

Climate

Prepared by the National Climatic Data Center, Asheville, North Carolina.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Reidsville, North Carolina, in the period 1962 to 1977. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 38 degrees F and the average daily minimum temperature is 28 degrees. The lowest temperature on record, which occurred at Reidsville on January 17, 1977, is -3 degrees. In summer, the average temperature is 74 degrees and the average daily maximum temperature is 85 degrees. The highest recorded temperature, which occurred on July 9, 1977, is 101 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 42 inches. Of this, about 22 inches, or more than 50 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 18 inches. The heaviest 1-day rainfall during the period of record was 5.15 inches at Reidsville on June 21, 1972. Thunderstorms occur on about 45 days each year.

The average seasonal snowfall is about 14 inches. The greatest snow depth at any one time during the period of record was 20 inches. On an average of 9

days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 55 percent. Humidity is higher at night, and the average at dawn is about 85 percent. The sun shines 65 percent of the time possible in summer and 55 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 9 miles per hour, in spring.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material from which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area are generally collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area

dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. In the detailed soil map units, these latter soils are called inclusions or included soils. In the general soil map units, they are called minor soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are identified in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or a building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Soil Descriptions

1. Pacolet-Madison-Cecil

Gently sloping to steep, deep, well drained soils that have a loamy surface layer and a loamy and clayey subsoil; on uplands

This map unit is on long, narrow, gently sloping ridges and strongly sloping to steep side slopes. It is in the northwestern and central parts of the county. Slopes range from 2 to 40 percent.

This map unit makes up about 34 percent of the county. It is about 40 percent Pacolet soils, 20 percent Madison soils, 15 percent Cecil soils, and 25 percent minor soils. The minor soils include Rion, Vance, Wateree, and Wilkes soils.

The Pacolet soils are on side slopes. Typically, the surface layer is brown sandy loam. The subsurface layer is dark yellowish brown sandy loam. The upper part of the subsoil is yellowish red sandy clay loam, the next part is red clay loam and clay, and the lower part is red sandy clay loam. The underlying material is red sandy loam.

The Madison soils are on ridgetops and side slopes. Typically, the surface layer is brown sandy loam. The subsurface layer is dark brown sandy loam. The subsoil is red clay in the upper part and red clay loam in the lower part. It has a high content of mica. The underlying material is red sandy loam.

The Cecil soils are on ridgetops. Typically, the surface layer is yellowish red sandy clay loam. The subsoil is red clay in the upper part and red clay loam in the lower part. The underlying material is red clay loam.

The major soils are used mainly as woodland and to a lesser extent as cropland or pasture. The slope is the main limitation affecting most uses.

2. Iredell-Mecklenburg

Gently sloping to strongly sloping, deep, well drained to somewhat poorly drained soils that have a loamy surface layer and a clayey and loamy subsoil; on uplands

This map unit is on broad, smooth ridges and side slopes. It is in the extreme southeastern part of the county, north of Lake Reidsville, between U.S. Highway 158 and U.S. Highway 29 Business, and along Williamson Creek. Slopes range from 2 to 15 percent.

This map unit makes up about 1 percent of the county. It is about 54 percent Iredell soils, 23 percent Mecklenburg soils, and 23 percent minor soils. The minor soils include Cecil, Pacolet, Hiwassee, and Wilkes soils.

The Iredell soils are moderately well drained or somewhat poorly drained. They are on smooth or slightly concave slopes around the head of intermittent drainageways. Typically, the surface layer is dark grayish brown fine sandy loam. The subsoil is yellowish brown, mottled clay in the upper part and olive brown, mottled clay loam and clay in the lower part. The underlying material is mottled greenish gray, black, yellowish brown, and grayish brown sandy loam.

The Mecklenburg soils are well drained. They are on ridgetops. Typically, the surface layer is yellowish red sandy clay loam. The subsoil is yellowish red clay in the upper part and yellowish red clay loam in the lower part. The underlying material is yellowish red and white sandy clay loam in the upper part and yellowish red and

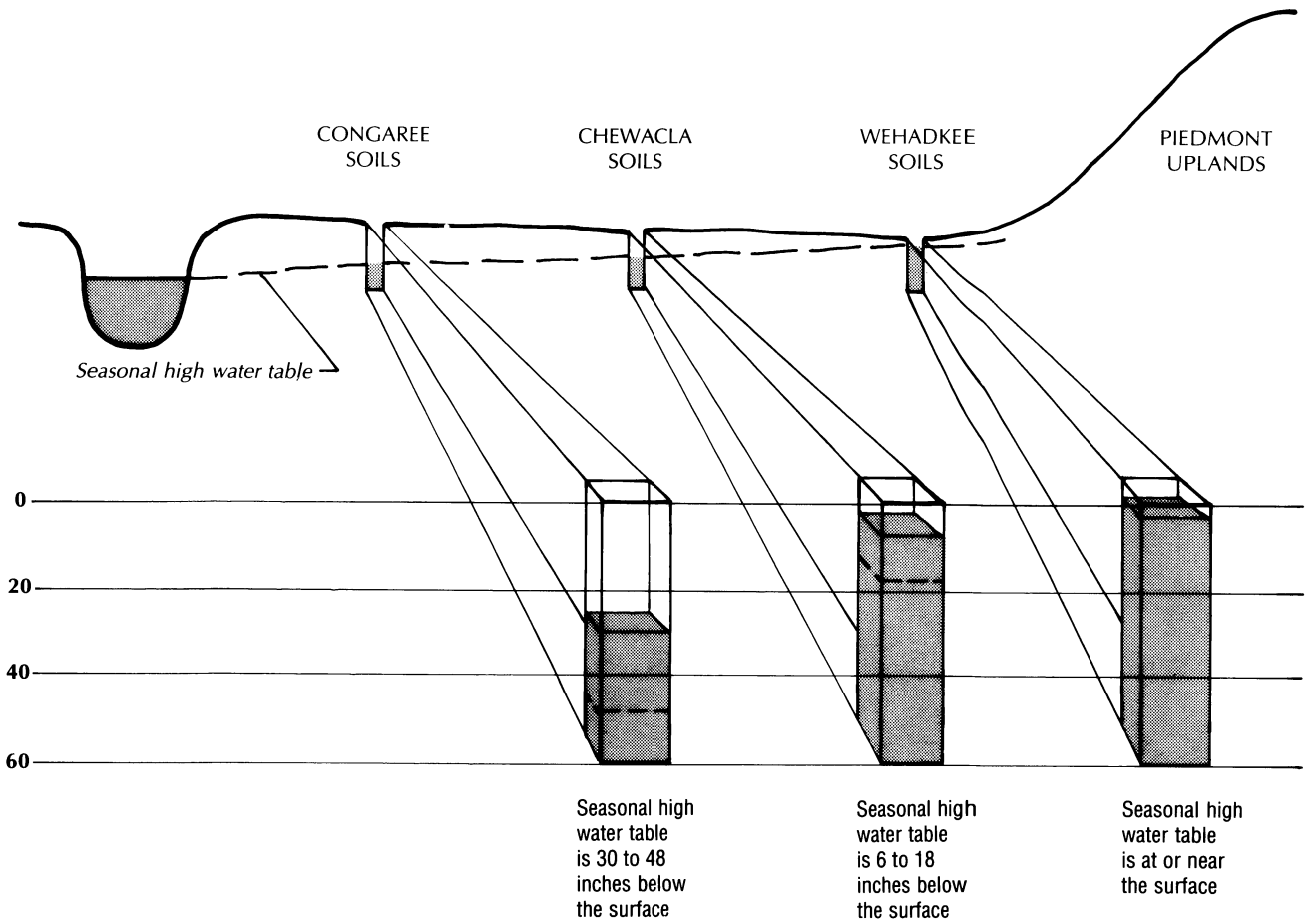


Figure 1.—Relationship between the landscape and the seasonal high water table in the Chewacla-Congaree-Wehadkee unit.

black sandy loam in the lower part.

The major soils are used mainly as woodland and to a lesser extent as pasture or cropland. Slow permeability and slope in areas of both soils and wetness in the Iredell soils are the main limitations affecting most uses.

3. Chewacla-Congaree-Wehadkee

Nearly level, deep, well drained to poorly drained soils that have a loamy surface layer and subsoil; on flood plains

This map unit is on flood plains along the major rivers and creeks throughout the county (fig. 1). Slopes range from 0 to 2 percent.

This map unit makes up about 6 percent of the county. It is about 52 percent Chewacla soils, 27 percent Congaree soils, 17 percent Wehadkee soils, and 4 percent minor soils. The minor soils include Chastain and Dogue soils.

The Chewacla soils are somewhat poorly drained. They are in nearly level or slightly concave areas. Typically, the surface layer is dark brown loam. The upper part of the subsoil also is dark brown loam. The next part is strong brown sandy clay loam and loam. The lower part is yellowish brown and dark brown loam.

The Congaree soils are well drained or moderately well drained. They are in slightly elevated positions and on natural levees adjacent to stream channels. Typically, the surface layer is brown loam. The upper part of the underlying material is reddish brown sandy loam. The next part is brown sandy clay loam and sandy loam and dark brown silty clay loam. The lower part is brown sandy clay loam.

The Wehadkee soils are poorly drained. They are in slightly concave areas. Typically, the surface layer is light brownish gray silt loam. The subsoil is light brownish gray, mottled sandy loam and silty clay loam in the upper part; grayish brown, mottled silty clay loam in the next part; and gray, mottled loam and clay loam in the lower part.

The Congaree soils are used mainly as cropland.

The Chewacla and Wehadkee soils are used mainly as woodland. Flooding and wetness are the main limitations affecting most uses.

4. Leaksville-Spray-Ayersville

Nearly level to steep, moderately deep and deep soils that are somewhat poorly drained or poorly drained or are excessively drained to well drained and that have a loamy surface layer and a loamy or clayey subsoil; on uplands

This map unit is on broad, low ridges and on some steep side slopes. It is between the eastern edge of Eden and the Virginia state line. Slopes generally are 0 to 5 percent but can be as much as 45 percent.

This map unit makes up about 2 percent of the county. It is about 28 percent Leaksville soils, 18 percent Spray soils, 10 percent Ayersville soils, and 44 percent minor soils (fig. 2). The minor soils include Stoneville, Mayodan, and Creedmoor soils.

The Leaksville soils are moderately deep and are somewhat poorly drained or poorly drained. They are on smooth flats and in slightly concave areas on ridges. Typically, the surface layer is dark grayish brown silt loam. The subsurface layer is light brownish gray channery silt loam. The subsoil is dark grayish brown clay in the upper part and dark grayish brown very channery silty clay loam in the lower part. It is underlain by moderately hard shale that has seams of dark grayish brown clay. Below this is hard bedrock.

The Spray soils are deep and well drained. They are on broad flats on ridges. Typically, the surface layer is dark brown loam. The subsoil is reddish brown clay. The underlying material is reddish brown extremely channery silt loam.

The Ayersville soils are moderately deep and are excessively drained to well drained. They are on convex ridgetops and side slopes. Typically, the surface layer and subsoil are dark reddish brown gravelly loam. The underlying material is reddish brown very gravelly silt loam. Moderately hard bedrock is at a depth of about 26 inches.

The Leaksville and Spray soils are used mainly as pasture and to a lesser extent as cropland or woodland. The Ayersville soils generally are wooded or are reverting to woodland. In some areas they are used as

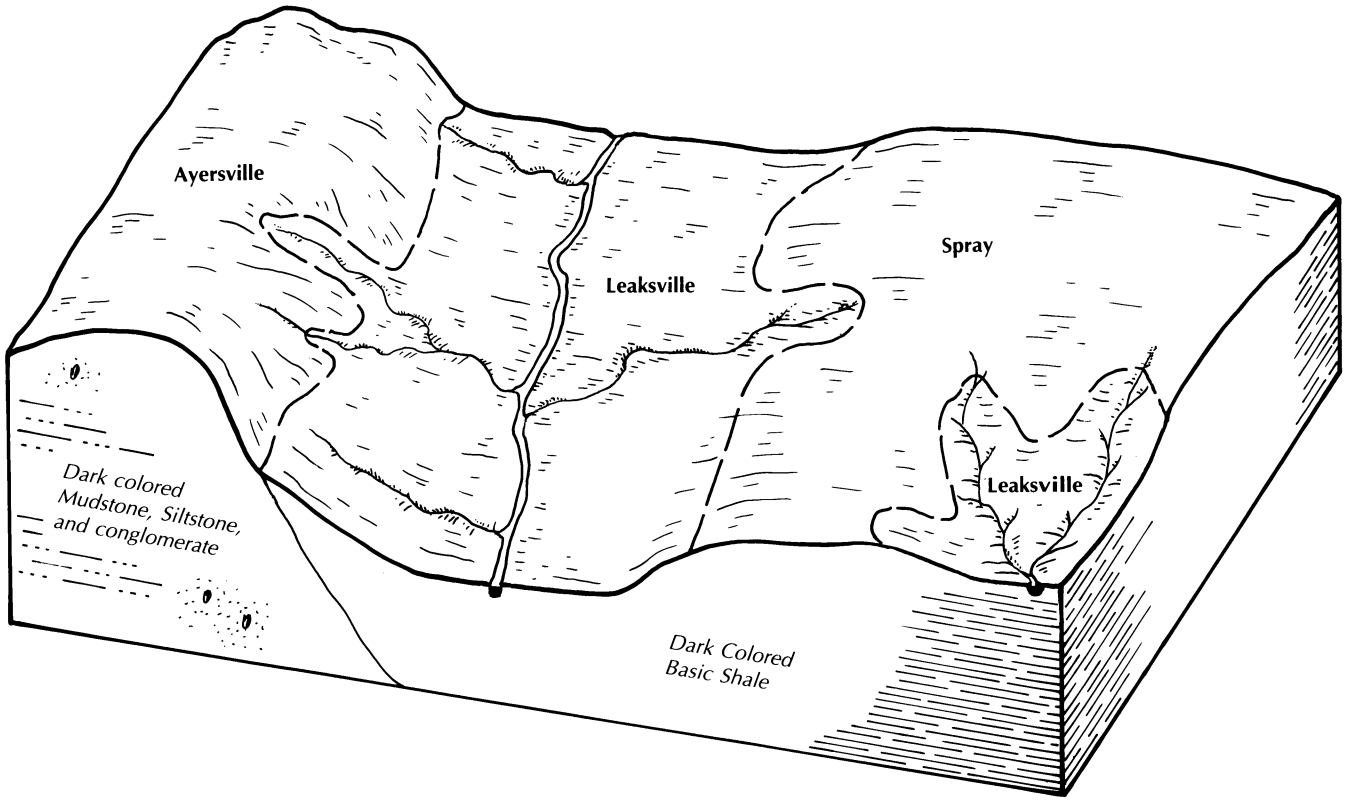


Figure 2.—Pattern of soils and parent material in the Leaksville-Spray-Ayersville unit.

pasture or cropland. The depth to bedrock in the Leaksville and Ayersville soils and wetness and slow permeability in the Leaksville soils are the main limitations.

5. Cecil-Pacolet-Appling

Gently sloping to steep, deep, well drained soils that have a loamy surface layer and a loamy and clayey subsoil; on uplands

This map unit is on broad, smooth ridges and side slopes. It is in the watershed of Troublesome Creek and in the vicinity of Oregon Hill and Ellisboro. Slopes range from 2 to 40 percent.

This map unit makes up about 32 percent of the county. It is about 50 percent Cecil soils, 20 percent Pacolet soils, 10 percent Appling soils, and 20 percent minor soils (fig. 3). The minor soils include Hiwassee, Iredell, Madison, and Rion soils.

The Cecil soils are on ridgetops. Typically, the surface layer is yellowish red sandy clay loam. The subsoil is red clay in the upper part and red clay loam in the lower part. The underlying material is red clay loam.

The Pacolet soils are on side slopes. Typically, the surface layer is brown sandy loam. The subsurface layer is dark yellowish brown sandy loam. The upper part of the subsoil is yellowish red sandy clay loam, the next part is red clay loam and clay, and the lower part is red sandy clay loam. The underlying material is red sandy loam.

The Appling soils are on broad, slightly concave ridgetops and side slopes. Typically, the surface layer is yellowish brown sandy loam. The subsoil is reddish

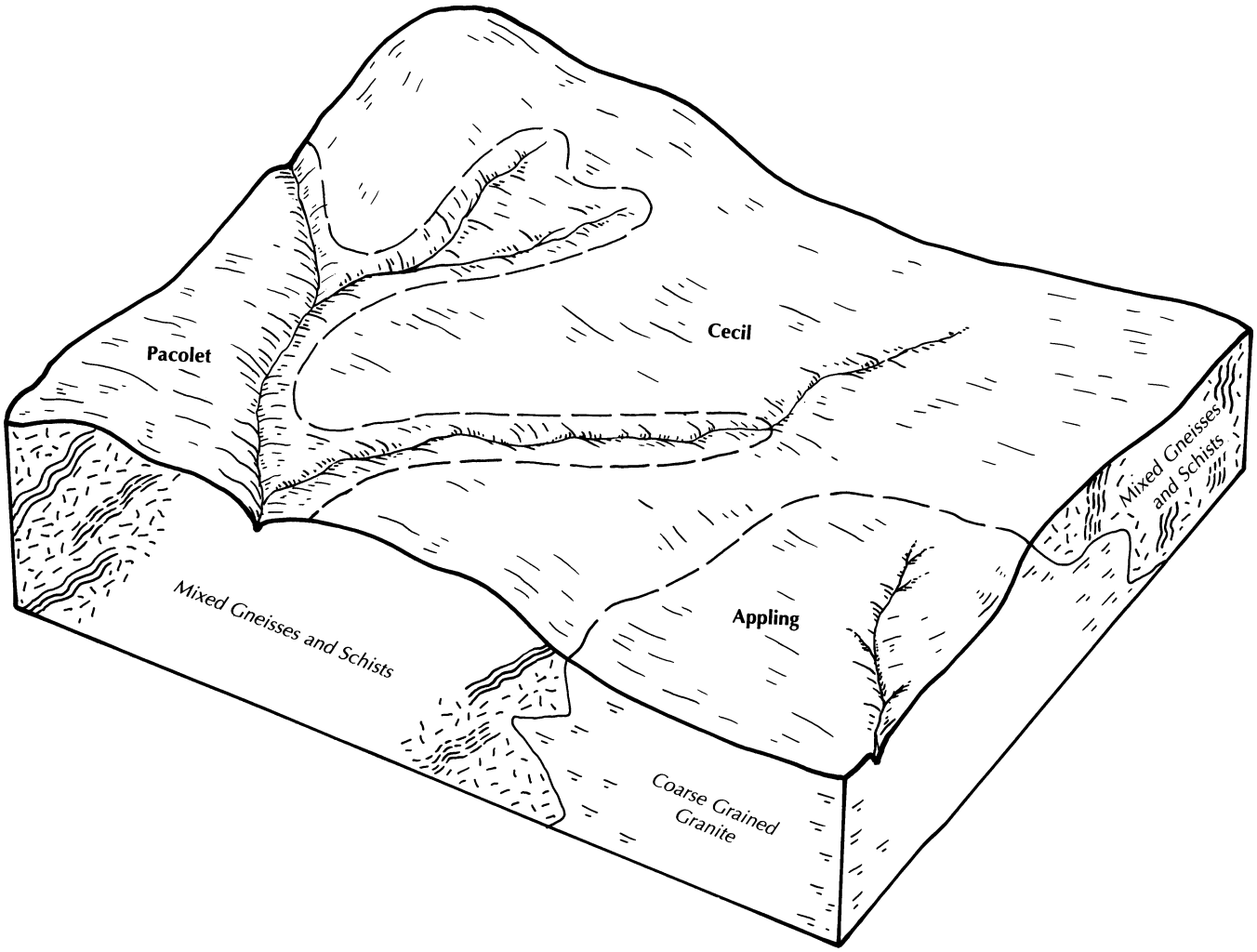


Figure 3.—Pattern of soils and parent material in the Cecil-Pacolet-Appling unit.

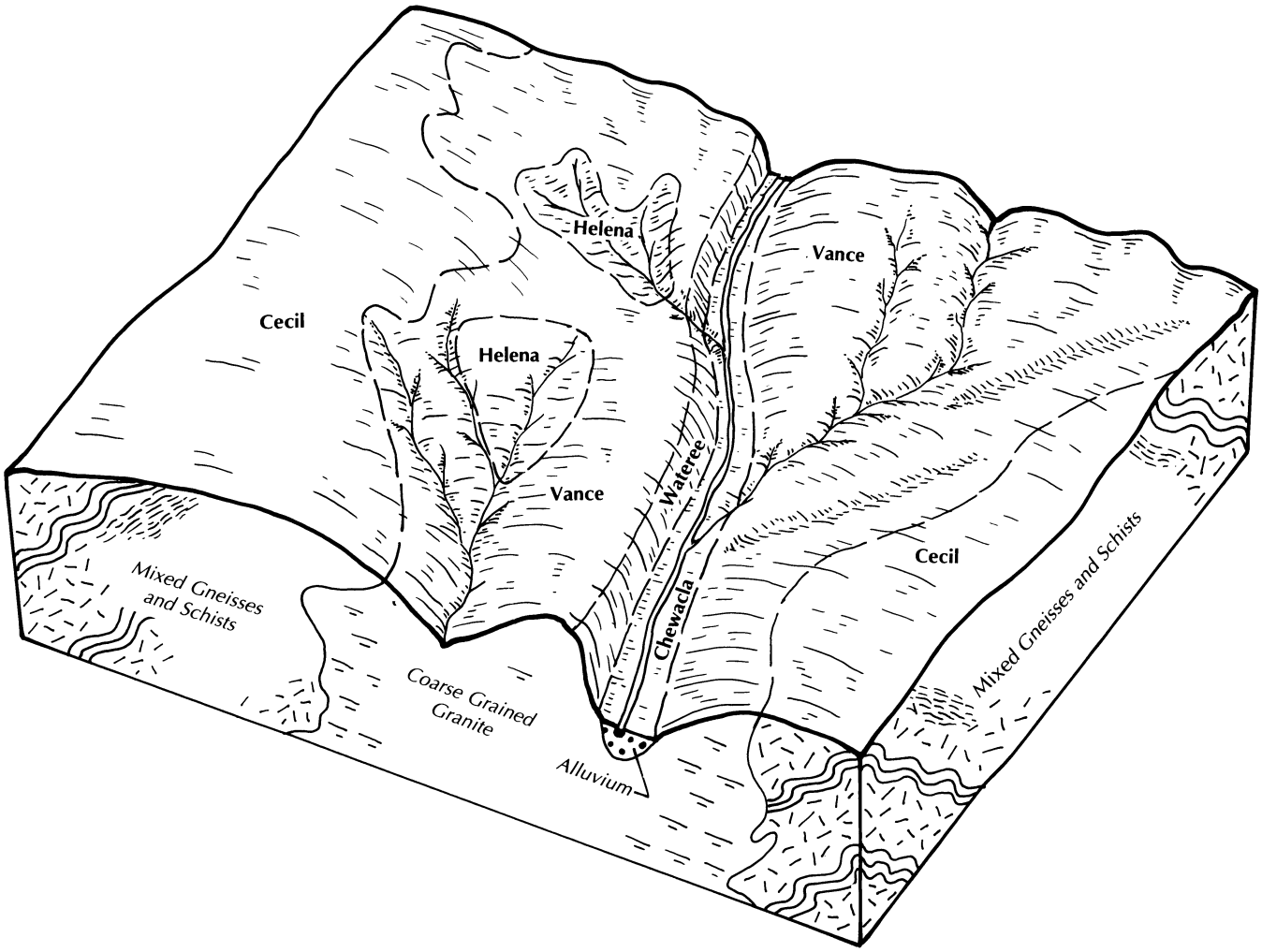


Figure 4.—Pattern of soils and parent material in the Vance-Cecil-Helena unit.

yellow sandy clay loam and clay loam in the upper part, strong brown clay and clay loam in the next part, and reddish yellow, mottled clay loam in the lower part. The underlying material is mottled reddish yellow, yellow, and red sandy clay loam.

The major soils are used mainly as cropland and to a lesser extent as pasture or woodland. Few limitations affect these uses. The slope is a limitation in some areas, especially in areas of the Pacolet soils.

6. Vance-Cecil-Helena

Gently sloping to strongly sloping, deep, well drained and moderately well drained soils that have a loamy surface layer and a loamy and clayey subsoil; on uplands

This map unit is on broad, smooth ridges and side slopes. It occurs as a narrow band that extends from the Guilford-Rockingham county line along N.C. Highway 150 to the Caswell-Rockingham county line. Slopes range from 2 to 15 percent.

This map unit makes up about 2 percent of the county. It is about 50 percent Vance soils, 30 percent Cecil soils, 10 percent Helena soils, and 10 percent minor soils (fig. 4). The minor soils include Chewacla, Pacolet, Hiwassee, Rion, and Wateree soils.

The Vance soils are well drained. They are on narrow, convex ridgetops and side slopes. Typically, the surface layer is yellowish brown sandy loam. The subsoil is strong brown and mottled. It is clay in the upper part and clay loam in the lower part. The underlying material is multicolored. It is sandy clay loam in the upper part and sandy loam in the lower part.

The Cecil soils are well drained. They are on broad, smooth ridgetops. Typically, the surface layer is yellowish red sandy clay loam. The subsoil is red clay in the upper part and red clay loam in the lower part. The

underlying material is red clay loam.

The Helena soils are moderately well drained. They are on the lower side slopes and around the head of intermittent drainageways. Typically, the surface layer is brown sandy loam. The subsurface layer is light yellowish brown sandy loam. The upper part of the subsoil is brownish yellow, mottled sandy clay loam; the next part is brownish yellow and light yellowish brown, mottled clay; and the lower part is strong brown, mottled clay loam. The underlying material is mottled strong brown, yellowish red, light gray, and white sandy clay loam.

The major soils are used mainly as cropland and to a lesser extent as pasture or woodland. Wetness in the Helena soils and slow permeability in the Vance and Helena soils are the main limitations.

7. Mayodan-Stoneville

Gently sloping to moderately steep, deep, well drained soils that have a loamy surface layer and a loamy and clayey subsoil; on uplands

This map unit is on moderately broad ridges and in hilly areas with moderately steep side slopes. It occurs as a 4- to 6-mile band that extends from the Stokes-Rockingham county line to the Virginia state line, parallel to the Dan River. Slopes range from 2 to 25 percent.

This map unit makes up about 16 percent of the county. It is about 50 percent Mayodan soils, 20 percent Stoneville soils, and 30 percent minor soils (fig. 5). The minor soils include Chewacla, Creedmoor, Ayersville, Pinkston, Pacolet, and Cecil soils.

The Mayodan soils are on slightly convex, broad to narrow ridges and side slopes. Typically, the surface layer is yellowish red sandy clay loam. The subsoil is red clay in the upper part and red, mottled clay loam in the lower part. The underlying material is mottled red, strong brown, reddish yellow, and dark gray sandy loam. The depth to bedrock is more than 60 inches.

The Stoneville soils are on slightly convex, broad to narrow ridges and side slopes. Typically, the surface layer is dark reddish brown loam. The subsoil is dark reddish brown. It is loam in the upper part, clay in the next part, and clay loam in the lower part. The underlying material is dark reddish brown loam. The depth to soft bedrock is 40 to 60 inches.

The Mayodan soils are used mainly as cropland and to a lesser extent as woodland or pasture. The Stoneville soils are used mainly as woodland or pasture and to a lesser extent as cropland. The slope of both soils and the depth to bedrock in some areas of the

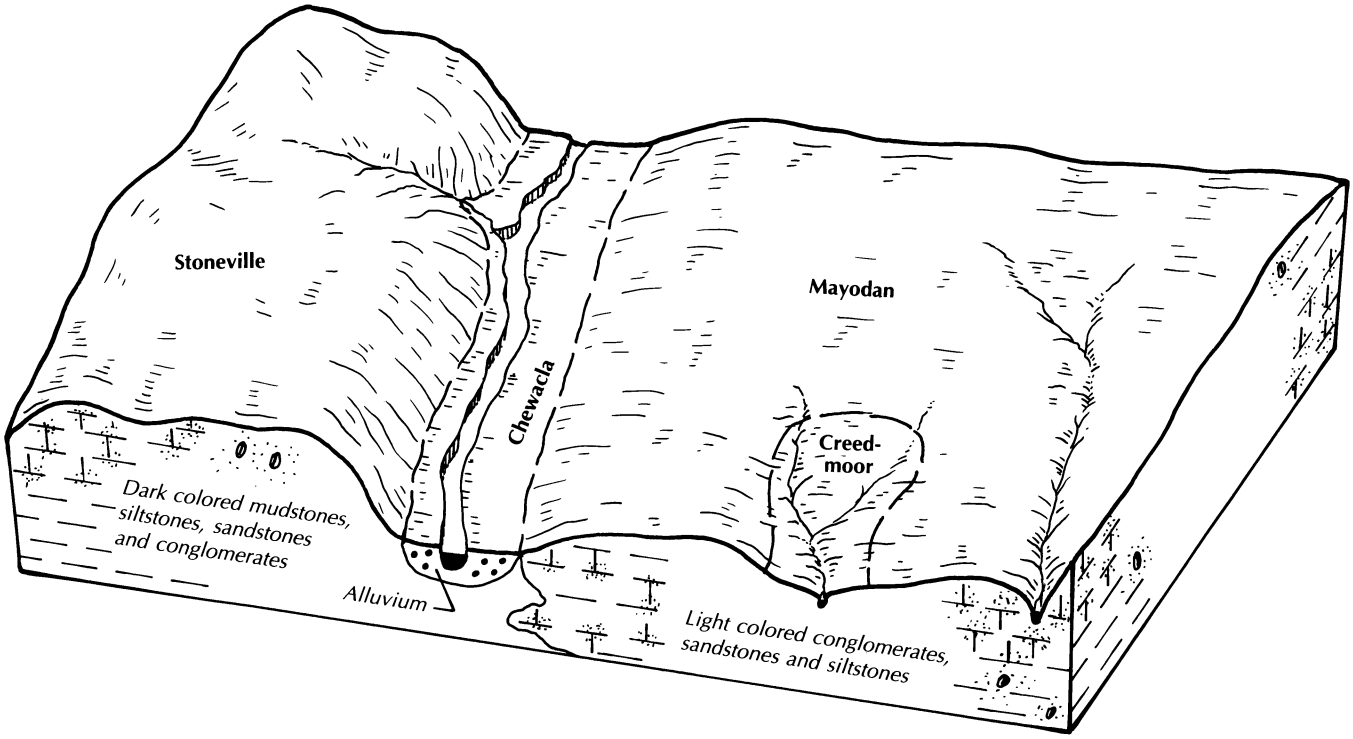


Figure 5.—Pattern of soils and parent material in the Mayodan-Stoneville unit.

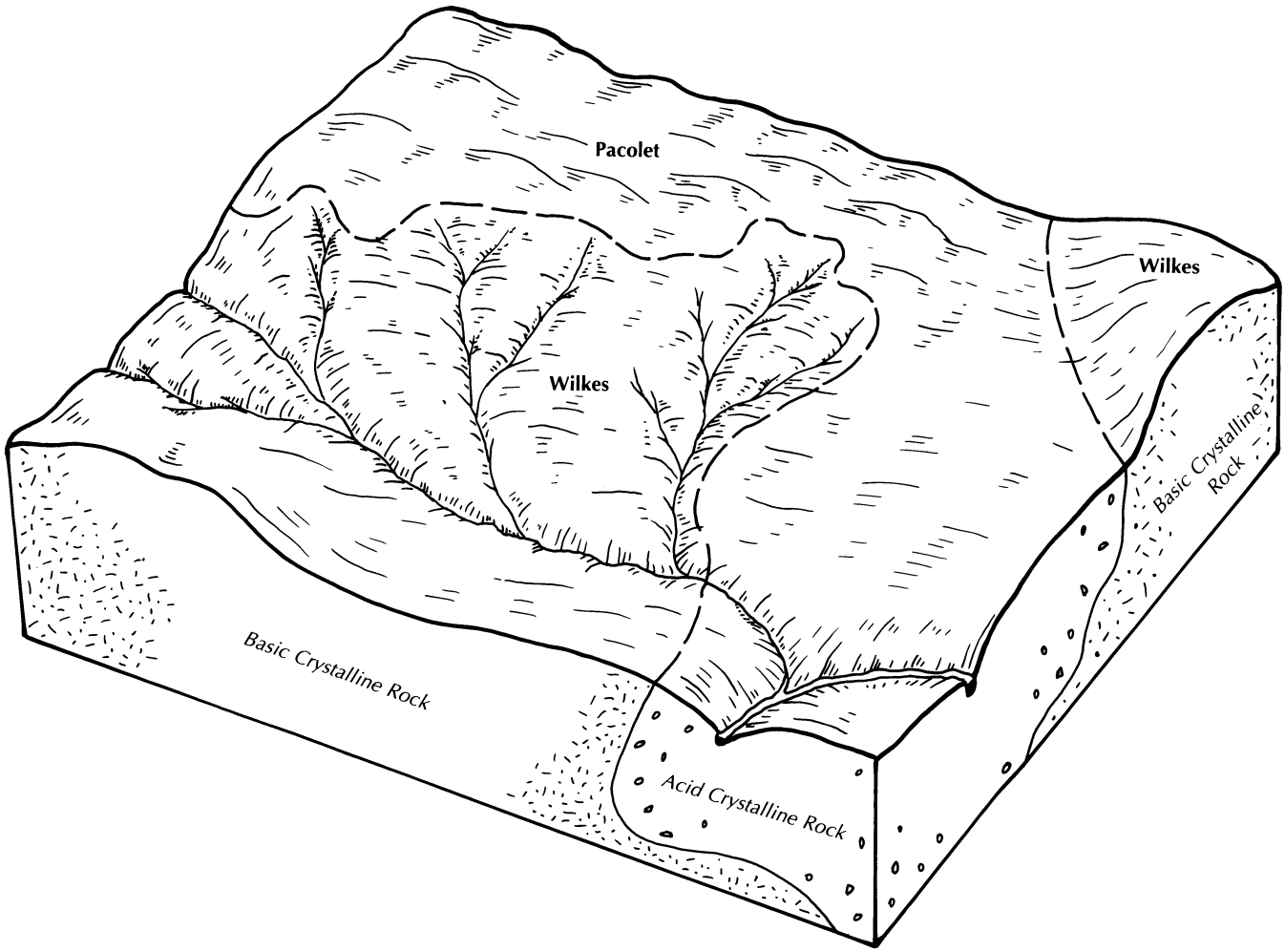


Figure 6.—Pattern of soils and parent material in the Pacolet-Wilkes unit.

Stoneville soils are the main limitations affecting most uses.

8. Pacolet-Wilkes

Gently sloping to steep, deep and shallow, well drained soils that have a loamy surface layer and a loamy and clayey subsoil; on uplands

This map unit is on gently sloping and strongly sloping ridgetops and steep side slopes. It is in the watershed of Hogans Creek, north of Williamsburg. Slopes range from 4 to 45 percent.

This map unit makes up about 7 percent of the county. It is about 42 percent Pacolet soils, 40 percent Wilkes soils, and 18 percent minor soils (fig. 6). The minor soils include Cecil, Madison, and Rion soils.

The Pacolet soils are deep. They are on narrow, slightly convex side slopes and bluffs. Typically, the surface layer is brown sandy loam. The subsurface layer is dark yellowish brown sandy loam. The upper part of the subsoil is yellowish red sandy clay loam, the next part is red clay loam and clay, and the lower part is red sandy clay loam. The underlying material is red sandy loam.

The Wilkes soils are shallow. They are on narrow ridges and slightly convex side slopes. Typically, the surface layer is brown sandy loam. The subsoil is strong brown sandy clay loam. Soft or moderately hard bedrock is within a depth of 20 inches.

The major soils are used mainly as woodland and to a lesser extent as pasture or cropland. The slope of both soils and the depth to bedrock in the Wilkes soils are the main limitations affecting most uses.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Madison sandy loam, 8 to 15 percent slopes, is a phase of the Madison series.

Some map units are made up of two or more major soils. These map units are called soil complexes. A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Madison-Udorthents complex, 2 to 15 percent slopes, gullied, is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Urban land is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

ApB—Appling sandy loam, 2 to 8 percent slopes. This well drained soil is on broad uplands. It is in slightly convex areas with gentle slopes. Individual areas are generally oblong and range from 25 to more than 100 acres in size.

Typically, the surface layer is yellowish brown sandy loam 9 inches thick. The subsoil is 37 inches thick. It is reddish yellow sandy clay loam and clay loam in the upper part, strong brown clay and clay loam in the next part, and reddish yellow, mottled clay loam in the lower part. The underlying material to a depth of 65 inches is mottled reddish yellow, yellow, and red sandy clay loam.

Erosion is a moderate hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is medium. Permeability and available water capacity are moderate. The soil can be tilled throughout a wide range in moisture content.

Included with this soil in mapping are some small areas of Appling soils that have slopes of more than 8 percent, a few small areas where the surface layer is sandy clay loam, and a few small gullied areas. Also included are some small areas of Cecil, Iredell, Helena, and Vance soils. The red Cecil soils and the very firm, sticky Vance soils are on knolls. Helena soils are near the head of and along intermittent drainageways. Iredell

Figure 7.—A grassed waterway of fescue in an area of Appling sandy loam, 2 to 8 percent slopes.

soils are on slightly elevated points and shoulder slopes in areas of basic rock intrusions. Helena, Iredell, and Vance soils require different management than Appling soils. Included soils make up 20 to 35 percent of the map unit.

Most areas are used as cropland or pasture. A few areas are wooded.

The major field crops are tobacco, corn, soybeans, and small grain. The principal horticultural crops are tomatoes, strawberries, sweet corn, green beans, and peas. The slope, surface runoff, and erosion are the main limitations in cultivated areas. Conservation tillage and crop residue management help to control runoff and erosion. Grassed waterways (fig. 7), terraces and diversions, contour farming, stripcropping, field borders, and crop rotations that include close-growing crops also conserve soil and water. Hay and pasture forage crops are grown in some areas. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In convex forested areas, Virginia pine, shortleaf pine, southern red oak, black oak, white oak, sweetgum, and hickory are the major canopy trees. Yellow poplar is the major canopy tree in small concave areas at the head of drainageways. The understory includes flowering dogwood, sourwood, holly, black cherry, and sassafras. Few limitations affect woodland management.

The moderate permeability may limit the use of this soil as a site for septic tank absorption fields.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

ApD—Appling sandy loam, 8 to 15 percent slopes. This well drained soil is on long, slightly convex, narrow side slopes. Individual areas are generally oblong and range from 7 to about 30 acres in size.

Typically, the surface layer is yellowish brown sandy loam 9 inches thick. The subsoil is 37 inches thick. It is reddish yellow sandy clay loam and clay loam in the upper part, strong brown clay and clay loam in the next part, and reddish yellow, mottled clay loam in the lower part. The underlying material to a depth of 65 inches is mottled reddish yellow, yellow, and red sandy clay loam.

Erosion is a severe hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability and available water capacity are moderate. The soil can be tilled throughout a wide range in moisture content.

Included with this soil in mapping are a few small areas where the surface layer is sandy clay loam and few small gullied areas. Also included are some small areas of Iredell, Pacolet, Vance, and Wilkes soils. The very firm, sticky Vance soils are on narrow, irregular side slopes and points. Iredell and Wilkes soils are on dikes of basic rocks that are slightly elevated or at the intersection of streams. Iredell, Vance, and Wilkes soils require different management than Appling soils. Pacolet soils are on side slopes in the more highly dissected areas. Included soils make up 20 to 35 percent of the map unit.

Most areas are used as cropland or pasture. Many areas are wooded.

The major field crops are tobacco, corn, oats, and soybeans. Slope, surface runoff, and erosion are the main limitations in cultivated areas. Conservation tillage and crop residue management help to control runoff and erosion. Sodded drainageways, terraces and diversions, stripcropping, contour farming, field borders, and crop rotations that include close-growing crops also conserve soil and water. Hay and pasture crops are grown in some areas. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In convex forested areas, Virginia pine, shortleaf pine, southern red oak, black oak, white oak, sweetgum, and hickory are the main canopy trees. Yellow poplar is the main canopy tree in small concave areas at the head of drainageways. The understory includes flowering dogwood, sourwood, holly, black cherry, and sassafras. Few limitations affect woodland management.

The slope is the main limitation affecting most urban and some recreational uses. The moderate permeability may limit the use of this soil as a site for septic tank absorption fields.

The capability subclass is IVe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

AyC—Ayersville gravelly loam, 4 to 15 percent slopes. This well drained to excessively drained soil is on convex ridgetops. Individual areas are generally oblong and range from 7 to more than 75 acres in size.

Typically, the surface layer is dark reddish brown gravelly loam 8 inches thick. The subsoil is 14 inches thick. It is dark reddish brown gravelly loam. The underlying material to a depth of 26 inches is reddish brown very gravelly silt loam. Below this is 4 inches of soft bedrock, which is underlain by hard bedrock.

Erosion is a moderate or severe hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is medium or rapid. Permeability is moderate. Available water capacity is very low or low. The root zone is moderately deep. The depth to hard bedrock ranges from 20 to 40 inches.

Included with this soil in mapping are a few areas of soils that have a surface layer of fine sandy loam or silt loam and some areas where hard bedrock is within a depth of 20 inches. Also included are some small areas of Stoneville and Mayodan soils on the smoother parts of the landscape and Leaksville and Spray soils at the lower elevations in the area northeast of Eden. Included soils make up 10 to 20 percent of the map unit.

Most areas are used as woodland. A few small areas are used as cropland or pasture.

Corn and corn silage are the principal crops grown in cultivated areas. The susceptibility to erosion and droughtiness are limitations. A few areas are used for hay and pasture forage crops. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In forested areas the principal trees are black oak, post oak, southern red oak, sweetgum, hickory, maple, shortleaf pine, and Virginia pine. The understory includes flowering dogwood, holly, sourwood, black cherry, redbud, sassafras, and huckleberry. The restricted rooting depth is the main limitation affecting woodland management.

The depth to hard bedrock is a limitation affecting most urban uses. The slope and the gravelly surface layer are limitations affecting some types of recreational uses.

The capability subclass is IVe. Based on shortleaf pine as the indicator species, the woodland ordination symbol is 6A.

AyF—Ayersville gravelly loam, 15 to 45 percent slopes. This well drained to excessively drained soil is on convex side slopes. Individual areas are generally

oblong and range from 7 to more than 50 acres in size.

Typically, the surface layer is dark reddish brown gravelly loam 8 inches thick. The subsoil is 14 inches thick. It is dark reddish brown gravelly loam. The underlying material to a depth of 26 inches is reddish brown very gravelly silt loam. Below this is 4 inches of soft bedrock, which is underlain by hard bedrock.

Erosion is a severe hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability is moderate. Available water capacity is very low or low. The root zone is moderately deep. The depth to hard bedrock ranges from 20 to 40 inches.

Included with this soil in mapping are a few areas of soils that have a surface layer of fine sandy loam or silt loam and some areas where hard bedrock is within a depth of 20 inches. Also included are some small areas of Stoneville and Mayodan soils on the smoother parts of the landscape and Leaksville and Spray soils at the lower elevations in the area northeast of Eden. Included soils make up 15 to 25 percent of the map unit.

Most areas are used as woodland. A few small areas are used as pasture or cropland.

This soil generally is not used for row crops. Some areas are used for hay and pasture forage crops. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In forested areas the principal trees are black oak, post oak, southern red oak, sweetgum, hickory, maple, shortleaf pine, and Virginia pine. The understory includes flowering dogwood, holly, sourwood, black cherry, redbud, sassafras, and huckleberry. The slope and the restricted rooting depth are the main limitations affecting woodland management.

The slope and the depth to hard bedrock are limitations affecting most urban and recreational uses.

The capability subclass is VIIe. Based on shortleaf pine as the indicator species, the woodland ordination symbol is 6R.

CcB—Cecil sandy loam, 2 to 8 percent slopes. This well drained soil is on broad, slightly convex ridges in the uplands. Individual areas are generally oblong and range from 25 to more than 100 acres in size.

Typically, the surface layer is yellowish red sandy loam 6 inches thick. The subsoil is 46 inches thick. It is red clay in the upper part and red clay loam in the lower part. The underlying material to a depth of 80 inches is mottled red and yellowish red clay loam.

Erosion is a moderate hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is medium. Permeability and available water capacity are moderate. The soil can be tilled throughout a wide range in moisture content.

Included with this soil in mapping are a few small eroded areas where the surface layer is sandy clay loam or clay loam and a few areas of Cecil soils that have slopes of more than 8 percent. Also included are a few small areas of Appling soils on the more concave parts of the landscape, especially at the head of intermittent drainageways; Mecklenburg soils on points and shoulder slopes that are underlain by basic rock intrusions; Hiwassee soils in areas that are adjacent to streams but are not subject to flooding; and Madison and Pacolet soils on the narrower ridgetops in the more dissected areas. Included soils make up 20 to 35 percent of the map unit.

Most areas are used as cropland or pasture. A few areas are wooded.

The principal crops are tobacco, corn, soybeans, and small grain. The chief horticultural crops are tomatoes, sweet corn, peaches, green beans, strawberries, and peas. The slope, surface runoff, and erosion are the main limitations in cultivated areas. Conservation tillage and crop residue management aid in controlling runoff and erosion. Sodded drainageways, terraces and diversions, field borders, contour farming, stripcropping, and crop rotations that include close-growing crops also conserve soil and water. Some areas are used for hay and pasture forage crops. This soil is well suited to alfalfa. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In convex forested areas, Virginia pine, shortleaf pine, southern red oak, black oak, white oak, sweetgum, and hickory are the main canopy trees. In small concave areas at the head of drainageways, yellow poplar is the major canopy tree. The understory includes flowering dogwood, eastern redcedar, holly, pin oak, sassafras, and black cherry. Few limitations affect woodland management.

The moderate permeability may limit the use of this soil as a site for septic tank absorption fields.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

CdB2—Cecil sandy clay loam, 2 to 8 percent slopes, eroded. This well drained soil is on broad, convex uplands. Individual areas are generally oblong and range from 25 to more than 100 acres in size.

Typically, the surface layer is a mixture of subsoil and topsoil. It is yellowish red sandy clay loam 6 inches thick. The subsoil is 46 inches thick. It is red clay in the upper part and red clay loam in the lower part. The underlying material to a depth of 80 inches is mottled red and yellowish red clay loam.

Further erosion is a severe hazard where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability and available water capacity are moderate. Because of a high content of clay in the surface layer, maintaining good tilth is difficult. The surface layer crusts easily after periods of rainfall, and clods form if the soil is worked when wet. The crust and the clods interfere with seed germination.

Included with this soil in mapping are a few small areas where the surface layer is sandy loam or clay loam and some areas of Cecil soils that have slopes of more than 8 percent. Also included are a few small areas of Appling soils on the more concave parts of the landscape, especially at the head of intermittent drainageways; Mecklenburg soils on points and shoulder slopes underlain by basic rock; Hiwassee soils in areas that are adjacent to streams but are not subject to flooding; and Madison and Pacolet soils on the narrower ridgetops in the more dissected areas. Included soils make up 20 to 35 percent of the map unit.

Most areas are used as cropland or pasture. A few areas are wooded.

The major field crops are tobacco, corn, soybeans, and small grain. The chief horticultural crops are tomatoes, sweet corn, peaches, green beans, strawberries, and peas. The slope, surface runoff, poor tilth, and the hazard of further erosion are the main management concerns in cultivated areas. Conservation tillage and crop residue management help to control runoff and erosion. Sodded drainageways, terraces and diversions, field borders, contour farming, stripcropping, and crop rotations that include close-growing crops also conserve soil and water. Some areas are used for hay and pasture forage crops. This soil is well suited to alfalfa. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In convex forested areas, Virginia pine, shortleaf pine, southern red oak, black oak, white oak, sweetgum, and hickory are the main canopy trees. Yellow poplar is the main canopy tree in small concave areas at the head of drainageways. The understory includes flowering dogwood, eastern redcedar, holly, pin oak, sassafras, and black cherry. The relatively high content of clay in the surface layer reduces the rate of water infiltration and increases the seedling mortality rate.

The moderate permeability may limit the use of this soil as a site for septic tank absorption fields.

The capability subclass is IIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7C.

CeC—Cecil-Urban land complex, 2 to 10 percent slopes. This map unit occurs as areas of a Cecil soil and Urban land. It is about 50 percent Cecil soil, 35 percent Urban land, and 15 percent included soils. Most areas are irregular in shape and range from 10 to 100 acres in size.

The well drained Cecil soil is in the open, relatively undisturbed areas. Typically, the surface layer is yellowish red sandy clay loam 6 inches thick. The subsoil is 46 inches thick. It is red clay in the upper part and red clay loam in the lower part. The underlying material to a depth of 80 inches is mottled red and yellowish red loam and clay loam.

The Urban land has an impervious surface. It is covered with shopping centers, factories, municipal buildings, houses, apartment complexes, parking lots, and roads. Slopes generally have been modified as needed during development. The extent of site modification varies. Some areas have undergone little disturbance, while others have been reshaped through extensive cutting, grading, and land filling.

Included in mapping are a few areas of Appling, Pacolet, and Rion soils. Appling soils are in slightly concave areas. Pacolet and Rion soils are along drainageways. Also included are areas that have been graded and reshaped.

The moderate permeability may limit the use of the Cecil soil as a site for septic tank absorption fields. Surface runoff on the Urban land greatly exceeds that on the Cecil soil. Recommendations for use and management of this unit generally require onsite investigation.

This unit has not been assigned a capability subclass or a woodland ordination symbol.

Ch—Chastain silty clay loam. This poorly drained soil is on nearly level or slightly depressional flood plains. It is frequently flooded, usually for very long periods in winter and spring. Slopes range from 0 to 2 percent. Individual areas are generally oblong and range from about 10 to more than 100 acres in size.

Typically, the surface layer is brown silty clay loam 6 inches thick. The subsoil extends to a depth of 64 inches. It is light brownish gray silty clay in the upper part, gray clay in the next part, and gray clay loam in the lower part.

Permeability is slow. Available water capacity is moderate. The shrink-swell potential also is moderate. The seasonal high water table is at or near the surface.

Included with this soil in mapping are a few small areas where the surface layer is loam or fine sandy loam. Also included are small areas of Chewacla and Wehadkee soils and areas of somewhat poorly drained

or moderately well drained soils on the higher parts of the landscape. Included soils make up 20 to 35 percent of the map unit.

Most areas are used as woodland. A few areas are used as pasture.

This soil generally is not used for cultivated crops or hay and pasture because of the wetness and the frequent flooding. Suitable drainage outlets generally are not available.

In forested areas ash, willow oak, and sweetgum are the main canopy trees. The understory species are red maple, winged elm, sourwood, and alders. The wetness and the flooding are the main limitations affecting woodland management.

The frequent flooding and the wetness are severe limitations affecting most urban and recreational uses. Overcoming these limitations is difficult and costly.

The capability subclass is VIw. Based on sweetgum as the indicator species, the woodland ordination symbol is 8W.

Ck—Chewacla loam. This somewhat poorly drained soil is in nearly level or slightly concave areas parallel to the major streams on flood plains. It is frequently flooded for brief periods in winter and spring. Slopes range from 0 to 2 percent. Individual areas are generally oblong and extend for a considerable distance along the stream valleys.

Typically, the surface layer is dark brown loam 6 inches thick. The subsoil is 54 inches thick. The upper part is dark brown, mottled loam. The next part is strong brown and yellowish brown, mottled sandy clay loam and loam. The lower part is yellowish brown and dark brown, mottled loam.

Permeability is moderate. Available water capacity is moderate or high. The seasonal high water table is 0.5 foot to 1.5 feet below the surface.

Included with this soil in mapping are a few small areas where the surface layer is silt loam, sandy loam, or loamy sand. Also included are a few small areas of Congaree soils on the slightly convex slopes closer to the streams and small areas of Wehadkee soils on slightly concave slopes at the contact between the flood plains and the uplands. Included soils make up 20 to 35 percent of the map unit.

Most areas are used as woodland. A few drained areas are used for cultivated crops.

Corn and soybeans are the main crops in the drained areas. Because of the flooding, these crops may be damaged in some years. In some years tillage is delayed in the spring because of the wetness. Conservation practices that include drainage measures, diversions, and field borders are needed. Suitable drainage outlets are not available in places. Some areas are used for hay and pasture forage crops. Proper pasture management helps to maintain a protective plant cover.

In forested areas Virginia pine, shortleaf pine, southern red oak, American sycamore, black oak, white oak, yellow poplar, sweetgum, and hickory are the main canopy trees. The understory species are flowering dogwood, sourwood, alders, red maple, and winged elm. The wetness and the flooding are the main limitations affecting woodland management.

The frequent flooding and the wetness are severe limitations affecting most urban and recreational uses. Overcoming these limitations is difficult and costly.

The capability subclass is IVw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 10W.

Co—Congaree loam. This well drained or moderately well drained soil is on moderately wide flood plains. It is frequently flooded for brief periods in winter and spring. Slopes range from 0 to 2 percent. Individual areas are generally oblong, are adjacent to the stream channels, and extend for a considerable distance along the streams.

Typically, the surface layer is brown loam 9 inches thick. The underlying material extends to a depth of 72 inches. It is reddish brown sandy loam in the upper part, brown sandy clay loam and sandy loam in the next part, and dark brown silty clay loam and brown sandy clay loam in the lower part.

Permeability is moderate. Available water capacity is moderate or high. The seasonal high water table is 2.5 to 4.0 feet below the surface. The soil can be tilled throughout a fairly wide range in moisture content.

Included with this soil in mapping are a few small areas where the surface layer is sandy loam. Also included are some small areas of Chewacla and Wehadkee soils in depressions at the contact between the flood plains and the uplands and small areas of soils that are sandy throughout. The sandy soils are along the inside bends of streams. Included soils make up 20 to 35 percent of the map unit.

Most areas are used as cropland or pasture. A few areas are wooded.

The principal crops are corn, tobacco, small grain, and soybeans. The flooding is the main hazard affecting crop production. The soil can be easily kept in good tilth and can be cropped year after year. The management practices needed on this soil include crop residue management, crop rotations, weed control, diversions, field borders, and measures that maintain stream channels. Hay and pasture forage crops are grown in some areas. Proper pasture management helps to maintain a protective plant cover.

In forested areas Virginia pine, shortleaf pine, yellow poplar, sweetgum, sycamore, walnut, persimmon, willow oak, black oak, post oak, southern red oak, crimson oak, beech, and river birch are the main canopy trees. The understory species are flowering dogwood, sourwood, redbud, and hophornbeam. In some years the flooding restricts harvesting or planting.

The flooding is a severe hazard affecting most urban and recreational uses.

The capability subclass is IIIw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9A.

CrB—Creedmoor fine sandy loam, 1 to 4 percent slopes. This moderately well drained soil is on fairly broad, smooth or slightly concave uplands adjacent to intermittent drainageways. Individual areas are generally oblong and range from 7 to about 30 acres in size.

Typically, the surface layer is brown fine sandy loam 7 inches thick. The subsurface layer is light yellowish brown fine sandy loam 4 inches thick. The subsoil extends to a depth of 47 inches. It is strong brown, mottled clay in the upper part and reddish brown clay in the lower part. The underlying material to a depth of 67 inches is dark reddish brown, yellowish red, and pinkish gray clay loam. Moderately hard, dark reddish brown, fine grained sandstone is at a depth of 67 inches.

Erosion is a moderate hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is slow or medium. Permeability is very slow. Available water capacity is moderate. The shrink-swell potential also is moderate (fig. 8). Because of the very slow permeability in the subsoil, a thin perched water table is at a depth of 1.5 to 2.0 feet during wet periods. In some areas the rooting depth is limited by high amounts of aluminum in the subsoil. The soil can be tilled throughout a wide range in moisture content.

Included with this soil in mapping are some small areas where the surface layer is loam or sandy loam. Also included are a few small areas of Leaksville soils in depressions around the head of and along intermittent drainageways and small areas of Mayodan, Stoneville, and Pinkston soils on the more convex slopes at the higher elevations. Included soils make up 20 to 35 percent of the map unit.

Most areas are used as woodland or are open areas that are cropped occasionally.

The major field crops are tobacco, corn, milo, and small grain. The most common horticultural crops are tomatoes, cucumbers, cantaloupes, sweet corn, green beans, and peas. The slope and the wetness are the main limitations affecting crop production. Conservation tillage and crop residue management help to control runoff and erosion. Sodded drainageways, stripcropping, field borders, land smoothing to remove surface water, contour farming, and crop rotations that include close-growing crops also conserve soil and water. Hay and pasture forage crops are grown in a few areas. Proper pasture management helps to maintain a protective plant cover.

Figure 8.—Profile of Creedmoor fine sandy loam, 1 to 4 percent slopes. Cracks form as this soil dries and shrinks.

In forested areas Virginia pine, shortleaf pine, yellow poplar, white oak, black oak, post oak, willow oak, and southern red oak are the main canopy trees. The understory species are flowering dogwood, American holly, sourwood, redbud, black cherry, eastern redcedar, and sassafras. The wetness can restrict the use of equipment. It is the main limitation affecting woodland management.

The wetness and the very slow permeability are severe limitations affecting urban and recreational uses.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8W.

DoB—Dogue loam, 0 to 4 percent slopes. This moderately well drained soil is on smooth or slightly concave slopes on broad, slightly elevated terraces. Individual areas are generally oblong and range from 7 to more than 50 acres in size.

Typically, the surface layer is brown loam 10 inches thick. The subsoil is 38 inches thick. The upper part is light yellowish brown clay loam. The next part is light yellowish brown, strong brown, and mottled strong brown, light yellowish brown, light brownish gray, gray, brownish yellow, and yellowish brown clay. The lower part is strong brown clay loam. The underlying material to a depth of 72 inches is strong brown fine sandy loam.

Erosion is a moderate hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is slow or medium. Permeability is moderately slow. Available water capacity is moderate. The shrink-swell potential also is moderate. The seasonal high water table is 1.5 to 3.0 feet below the surface. The soil can be tilled throughout a fairly wide range in moisture content.

Included with this soil in mapping are small areas of Chewacla, Hiwassee, and Wickham soils. Chewacla soils are on the lower parts of the landscape and are frequently flooded. The well drained Hiwassee and Wickham soils are in the higher convex areas. Wickham soils contain less clay than the Dogue soil. Included soils make up 10 to 20 percent of the map unit.

Most areas are used as cropland or pasture. Some areas are forested.

The major field crops are corn, soybeans, and small grain. Crop residue management helps to maintain tilth. No-till planting, field borders, land smoothing to remove surface water, and crop rotations that include close-growing crops conserve soil and water. Hay and pasture forage crops are grown in some areas. Proper pasture management helps to maintain a protective plant cover.

In forested areas southern red oak, sweetgum, yellow poplar, and white oak are the main canopy trees. The understory species are dogwood, American holly, sourwood, redbud, black cherry, eastern redcedar, and sassafras. The wetness can restrict the use of equipment. It is the main limitation affecting woodland management.

The wetness, the moderately slow permeability, and the moderate shrink-swell potential are limitations affecting most urban and recreational uses.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9W.

HeB—Helena sandy loam, 2 to 8 percent slopes. This moderately well drained soil is on smooth or slightly concave slopes in low areas at the head of and along intermittent drainageways. Individual areas are generally oblong and range from 7 to 30 acres in size.

Typically, the surface layer is brown sandy loam 5 inches thick. The subsurface layer is yellowish brown sandy loam 7 inches thick. The subsoil is 30 inches thick. The upper part is brownish yellow, mottled sandy clay loam. The next part is brownish yellow and light yellowish brown, mottled clay. The lower part is strong brown, mottled clay loam. The underlying material to a depth of 60 inches is mottled strong brown, yellowish red, light gray, and white sandy loam.

Erosion is a moderate hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is medium. Permeability is slow. Available water capacity is moderate. The shrink-swell potential is high. Because of the slow permeability in the subsoil, the soil has a perched seasonal high water table 1.5 to 2.5 feet below the surface. The soil can be tilled throughout a wide range in moisture content.

Included with this soil in mapping are some small areas where the surface layer is gravelly and a few small eroded areas. Also included are areas of Vance soils on the higher knolls and ridgetops; Cecil and Appling soils on the broader, less dissected ridgetops; and Sedgefield soils, which are intermingled with the Helena soil in areas that are underlain by mafic rocks. Included soils make up 10 to 25 percent of the map unit.

Most areas are used as cropland or pasture. Some areas are wooded.

The major field crops are tobacco, corn, milo, and small grain. The most common horticultural crops are tomatoes, cucumbers, cantaloupes, sweet corn, green beans, strawberries, and peas. The slope and the seasonal wetness are the main limitations affecting crop production. Conservation tillage and crop residue management help to control runoff and erosion. Sodded drainageways, stripcropping, land smoothing to remove surface water, field borders, contour farming, and crop rotations that include close-growing crops also conserve soil and water. Hay and pasture forage crops are grown in some areas. Proper pasture management helps to maintain a protective plant cover.

In forested areas yellow poplar, white oak, black oak, post oak, northern red oak, southern red oak, crimson oak, sweetgum, hickory, maple, blackjack oak, willow

oak, Virginia pine, and shortleaf pine are the main canopy trees. The understory species are flowering dogwood, holly, sourwood, redbud, black cherry, sassafras, and eastern redcedar. The wetness is the main limitation affecting woodland management.

The slow permeability, the wetness, and the high shrink-swell potential are limitations affecting most urban and recreational uses.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8W.

HwB—Hiwassee loam, 2 to 8 percent slopes. This well drained soil is on smooth or slightly convex slopes on high stream terraces. Individual areas are generally oblong and range from 7 to more than 30 acres in size.

Typically, the surface layer is dark reddish brown loam 10 inches thick. The subsoil is 54 inches thick. The upper part is dark red clay loam. The next part is dark red clay. The lower part is red clay loam. The underlying material to a depth of 80 inches is red sandy clay loam.

Erosion is a moderate hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is medium. Permeability and available water capacity are moderate. The shrink-swell potential also is moderate. The soil can be tilled throughout a fairly wide range in moisture content.

Included with this soil in mapping are a few small areas where slopes are slightly more than 8 percent. Also included are a few small areas of Appling, Cecil, Pacolet, Wilkes, and Wickham soils. Appling soils are near the outer edge of the larger areas of this map unit. Cecil and Pacolet soils are in the more dissected areas. Wilkes soils are on points and the outer shoulder slopes of some of the smaller areas of this map unit. Wickham soils are at some of the lower elevations. Included soils make up 10 to 25 percent of the map unit.

Most areas are used as cropland or pasture. Some areas are wooded.

The major field crops are corn, soybeans, and small grain. The slope, surface runoff, and erosion are the main limitations affecting crop production. Conservation tillage and crop residue management help to control runoff and erosion. Sodded drainageways, terraces and diversions, field borders, stripcropping, and crop rotations that include close-growing crops also conserve soil and water. Some areas are used for hay and pasture forage crops. This soil is well suited to alfalfa. Proper pasture management helps to maintain a protective plant cover.

In forested areas white oak, black oak, post oak, northern red oak, southern red oak, crimson oak, yellow poplar, sweetgum, hickory, maple, ash, beech, shortleaf pine, and Virginia pine are the main canopy trees. The understory species are flowering dogwood, sourwood, holly, redbud, sassafras, and eastern redcedar. Few limitations affect woodland management.

The moderate permeability may limit the use of this soil as a site for septic tank absorption fields.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7A.

HwD—Hiwassee loam, 8 to 15 percent slopes. This well drained soil is on the lower convex side slopes. Individual areas are generally oblong or long and range from 7 to about 20 acres in size.

Typically, the surface layer is dark reddish brown loam 10 inches thick. The subsoil is 54 inches thick. The upper part is dark red clay loam. The next part is dark red clay. The lower part is red clay loam. The underlying material to a depth of 80 inches is red sandy clay loam.

Erosion is a severe hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability and available water capacity are moderate. The shrink-swell potential also is moderate. The soil can be tilled throughout a fairly wide range in moisture content.

Included with this soil in mapping are a few small areas where the slope is slightly more than 15 percent. Also included are a few small areas of Cecil, Pacolet, and Wilkes soils. Cecil and Pacolet soils are in the more dissected areas. Wilkes soils are on points intermingled with the Hiwassee soil in areas that have small dikes of basic rocks extending to the surface. Included soils make up about 15 to 30 percent of the map unit.

Most areas are used as woodland or pasture. A few areas are used as cropland.

The major field crops are corn, soybeans, and small grain. Minimum tillage and crop residue management help to control runoff and erosion. Sodded drainageways, field borders, stripcropping, and crop rotations that include close-growing crops also conserve soil and water. Some areas are used for hay and pasture forage crops. Grasses and legumes, especially alfalfa, usually grow well on this soil. Proper pasture management helps to maintain a protective plant cover.

In forested areas white oak, black oak, post oak, northern red oak, southern red oak, crimson oak, yellow poplar, sweetgum, hickory, maple, ash, beech, shortleaf pine, and Virginia pine are the main canopy trees. The understory species are flowering dogwood, sourwood, holly, redbud, sassafras, and eastern redcedar. Few limitations affect woodland management.

The moderate permeability and the slope are

limitations affecting urban and recreational uses.

The capability subclass is IVe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7A.

IrB—Iredell fine sandy loam, 2 to 8 percent slopes. This moderately well drained or somewhat poorly drained soil is on smooth or slightly concave slopes around the head of intermittent drainageways. Individual areas are generally oblong and range from 7 to about 50 acres in size.

Typically, the surface layer is dark grayish brown fine sandy loam 4 inches thick. The subsurface layer is light olive brown fine sandy loam 4 inches thick. The subsoil is 20 inches thick. The upper part is yellowish brown, mottled clay. The lower part is olive brown, mottled clay and clay loam. The underlying material to a depth of 60 inches is mottled dark greenish gray, black, yellowish brown, and grayish brown sandy loam.

Erosion is a moderate hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is medium. Permeability is slow. Available water capacity is high. The shrink-swell potential is very high. Because of the slowly permeable subsoil, a perched water table is at a depth of 1 to 2 feet during wet periods. The soil can be tilled only within a narrow range in moisture content.

Included with this soil in mapping are a few areas of soils that have a surface layer of sandy loam. Also included are some small areas of Mecklenburg soils on the slightly higher convex parts of the landscape and Wilkes soils on the slightly steeper, more dissected parts. Included soils make up about 10 to 25 percent of the map unit.

Most areas are used as woodland. A few areas are used as cropland or pasture.

Corn, soybeans, and small grain are the principal field crops. Tobacco can be grown if surface water is removed by a bedding system and land smoothing. Conservation practices should include sodded drainageways, crop rotations, and field borders. Some areas are used for hay and pasture forage crops. Grazing when the soil is wet can cause surface compaction and can roughen the surface. Proper pasture management helps to ensure a protective plant cover.

In forested areas Virginia pine, shortleaf pine, eastern redcedar, blackjack oak, and willow oak are the main canopy trees. The understory species are flowering dogwood, cedar, sourwood, redbud, black cherry, and sassafras. The clayey subsoil restricts tree growth and results in moderate to low productivity.

The wetness, the slow permeability, and the high shrink-swell potential limit the use of this soil as a site for most urban and recreational uses.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 6C.

IrD—Iredell fine sandy loam, 8 to 15 percent slopes. This moderately well drained or somewhat poorly drained soil is on convex slopes on narrow side slopes. Individual areas are generally long and narrow and range from 7 to about 30 acres in size.

Typically, the surface layer is dark grayish brown fine sandy loam 4 inches thick. The subsurface layer is light olive brown fine sandy loam 4 inches thick. The subsoil is 20 inches thick. The upper part is yellowish brown, mottled clay. The lower part is olive brown, mottled clay and clay loam. The underlying material to a depth of 60 inches is mottled dark greenish gray, black, yellowish brown, and grayish brown sandy loam.

Erosion is a severe hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability is slow. Available water capacity is high. The shrink-swell potential is very high. Because of the slowly permeable subsoil, a perched water table is at a depth of 1 to 2 feet during wet periods. The soil can be tilled only within a narrow range in moisture content.

Included with this soil in mapping are a few small areas of soils that have a surface layer of fine sandy loam or sandy clay loam and a few small areas of Rion soils. Rion soils are intermingled with the Iredell soil in areas underlain by acid crystalline rocks. Also included are Wilkes soils in highly dissected areas and along short bluffs. Included soils make up about 20 to 30 percent of the map unit.

Most areas are used as woodland. Some small areas are used as pasture or cropland.

Crops generally are not grown on this soil because of the slope, surface runoff, erosion, and the clayey subsoil. Hay and pasture forage crops are grown in a few areas. Grazing when the soil is wet can cause surface compaction and can roughen the surface. Proper pasture management helps to ensure a protective plant cover.

In forested areas Virginia pine, shortleaf pine, eastern redcedar, blackjack oak, and willow oak are the main canopy trees. The understory species are flowering dogwood, cedar, sourwood, redbud, black cherry, and sassafras. The clayey subsoil restricts tree growth and results in moderate to low productivity.

The wetness, the slow permeability, the high shrink-swell potential, and the slope limit the use of this soil as a site for most urban and recreational uses.

The capability subclass is VIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 6C.

LeB—Leaksville silt loam, 0 to 4 percent slopes. This poorly drained or somewhat poorly drained soil is on smooth flats, in concave areas, and around the head of and along intermittent drainageways. Individual areas are generally oblong and range from 7 to 50 acres in size.

Typically, the surface layer is dark grayish brown silt loam 6 inches thick. The subsurface layer is light brownish gray, mottled channery silt loam 3 inches thick. The subsoil is 15 inches thick. The upper part is dark grayish brown, mottled clay. The lower part is dark grayish brown, mottled very channery silty clay loam. The subsoil is underlain by moderately hard shale that has seams of dark grayish brown clay in the cracks. Hard shale bedrock is at a depth of 30 inches.

Surface runoff is slow or medium. Permeability is slow. Available water capacity is low. The shrink-swell potential is high. During wet periods a perched water table is within 2 feet of the surface. Also, surface water from the adjacent soils commonly drains onto this soil. The depth to hard shale bedrock ranges from 24 to 60 inches.

Included with this soil in mapping are a few areas of soils that have a surface layer of loam. This surface layer is slightly thicker than that of the Leaksville soil. Also included are some small areas of Spray and Ayersville soils and some areas where the depth to hard shale is less than 24 inches. Spray and Ayersville soils are commonly near the edge of the mapped areas. Included soils make up about 10 to 20 percent of the map unit.

Most areas are used as pasture or woodland. The pastured areas are mainly at the higher elevations. The woodland is mainly in the flatter areas near streams.

Cultivated crops are generally not grown on this soil. Some areas are used as pasture. Grazing when the soil is wet can cause surface compaction and can roughen the surface. Proper pasture management helps to ensure a protective plant cover.

In forested areas willow oak, shagbark hickory, southern red oak, and eastern redcedar are the main canopy trees. The understory species are sourwood, flowering dogwood, greenbrier, eastern redbud, winged elm, and huckleberry. The wetness and a restricted rooting depth are the main limitations affecting woodland management.

The wetness, the high shrink-swell potential, and the depth to hard bedrock are severe limitations affecting most urban and recreational uses.

The capability subclass is IIIw. Based on shortleaf pine as the indicator species, the woodland ordination symbol is 6C.

LkB—Leaksville-Urban land complex, 0 to 4 percent slopes. This map unit occurs as areas of a Leaksville soil and Urban land. It is about 50 percent Leaksville soil, 40 percent Urban land, and 10 percent included soils.

The somewhat poorly drained or poorly drained Leaksville soil is in the open, relatively undisturbed areas. Typically, the surface layer is dark grayish brown silt loam 6 inches thick. The subsurface layer is light brownish gray, mottled channery silt loam 3 inches thick. The subsoil is 15 inches thick. The upper part is dark grayish brown, mottled clay. The lower part is dark grayish brown, mottled very channery silty clay loam. The subsoil is underlain by moderately hard shale that has seams of dark grayish brown clay in the cracks. Hard shale bedrock is at a depth of 30 inches.

The Urban land has an impervious surface. It is covered with shopping centers, factories, municipal buildings, apartment complexes, parking lots, houses, or other structures in areas where buildings are closely spaced or the surface is paved. Slopes generally have been modified as needed during development. The extent of site modification varies greatly. Some areas have undergone little disturbance, but other areas have been reshaped through extensive cutting, grading, and land filling.

Included in mapping are a few areas of Spray soils.

The wetness, the high shrink-swell potential, and the depth to hard bedrock limit the use of the Leaksville soil as a site for most urban uses. Surface runoff on the Urban land greatly exceeds that on the Leaksville soil. Recommendations for use and management of this unit generally require onsite investigation.

This unit has not been assigned a capability subclass or a woodland ordination symbol.

MaD—Madison sandy loam, 8 to 15 percent slopes. This well drained soil is on convex side slopes and narrow ridges. Individual areas are generally oblong and range from 7 to more than 100 acres in size.

Typically, the surface layer is brown sandy loam 3 inches thick. The subsurface layer is dark brown sandy loam 5 inches thick. The subsoil is 23 inches thick. It is red clay in the upper part and red clay loam in the lower part. The underlying material to a depth of 60 inches is red sandy loam.

Erosion is a severe hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability and available water capacity are moderate.

Included with this soil in mapping are a few small eroded areas where the surface layer is sandy clay loam. Also included are Pacolet soils in small areas where acid crystalline rocks low in content of mica extend to the surface and Wilkes soils in small areas underlain by mafic rocks. Included soils make up 10 to 20 percent of the map unit.

Most areas are used as woodland. Some small areas are used as pasture or cropland.

A few areas of this soil are used for corn or small grain. The slope, surface runoff, and erosion are the main limitations affecting crop production. Conservation tillage and crop residue management help to control runoff and erosion. Grassed waterways, terraces and diversions, stripcropping, field borders, contour farming, and crop rotations that include close-growing crops also conserve soil and water. A few areas are used for hay and pasture forage crops. Proper pasture management helps to maintain a protective plant cover.

In forested areas Virginia pine, shortleaf pine, white oak, southern red oak, sweetgum, and yellow poplar are the main canopy trees. The understory species are red maple, flowering dogwood, eastern redcedar, redbud, holly, sassafras, and black cherry. Few limitations affect woodland management.

This soil is moderately limited as a site for most urban and recreational uses. Because of the content of mica, compacting the soil is difficult on sites for embankments, dikes, and levees.

The capability subclass is IVe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7A.

MaE—Madison sandy loam, 15 to 35 percent slopes. This well drained soil is on narrow side slopes. Individual areas are generally oblong and range from 7 to more than 100 acres in size.

Typically, the surface layer is brown sandy loam 3 inches thick. The subsurface layer is dark brown sandy loam 5 inches thick. The subsoil is 23 inches thick. It is red clay in the upper part and red clay loam in the lower part. The underlying material to a depth of 60 inches is red sandy loam.

Erosion is a severe hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability and available water capacity are moderate.

Included with this soil in mapping are a few eroded spots and some areas of soils that have less clay in the subsoil than the Madison soil. Also included are Pacolet soils in small areas where acid crystalline rocks low in content of mica extend to the surface and Wilkes soils in small areas underlain by mafic rocks. Included soils make up 10 to 20 percent of the map unit.

Most areas are used as woodland. Some small areas are used as pasture.

This soil generally is not used for cultivated crops. A few areas are used for hay and pasture forage crops. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In forested areas Virginia pine, shortleaf pine, white oak, southern red oak, sweetgum, and yellow poplar are the main canopy trees. The understory species are red maple, flowering dogwood, eastern redcedar, holly, and pin oak. The slope is the main limitation affecting woodland management.

The slope is a severe limitation affecting most urban and recreational uses.

The capability subclass is VIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7R.

MbB2—Madison sandy clay loam, 2 to 8 percent slopes, eroded. This well drained soil is on narrow ridges. Individual areas are generally oblong and range from 7 to 100 acres in size.

Erosion has removed part of the original surface layer. The present surface layer is a mixture of the original surface layer and subsoil material. It is brown sandy clay loam 8 inches thick. The subsoil is 23 inches thick. The upper part is red clay, and the lower part is red clay loam. The underlying material to a depth of 60 inches is red sandy loam.

Further erosion is a moderate hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability and available water capacity are moderate. Because of a high content of clay in the surface layer, maintaining good tilth is difficult. When the surface is exposed, a crust forms after heavy rains. Also, clods form if the soil is worked when wet.

Included with this soil in mapping are some small areas where the surface layer is sandy loam or clay loam, a few small areas that have slopes of more than 8 percent, and some areas that have a few shallow gullies. Also included are some small areas of Cecil, Pacolet, and Wilkes soils. Cecil and Pacolet soils are in areas where acid crystalline rocks low in content of mica extend to the surface. Wilkes soils are on knobby points and shoulder slopes in areas underlain by mafic rocks. Included soils make up 15 to 25 percent of the map unit.

Most areas are used as cropland or pasture. Some areas are used as woodland.

The major field crops are corn, tobacco, and soybeans. The slope, surface runoff, and erosion are the main limitations. Conservation tillage and crop

residue management help to control runoff and erosion. Sodded drainageways, terraces and diversions, stripcropping, field borders, contour farming, and crop rotations that include close-growing crops also conserve soil and water. Hay and pasture forage crops are grown in some areas. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In forested areas shortleaf pine, Virginia pine, sweetgum, southern red oak, white oak, and maple are the main canopy trees. The understory species are flowering dogwood, cedar, holly, pin oak, sassafras, black cherry, and redbud. The high content of clay in the surface layer is the main limitation affecting woodland management.

This soil is moderately limited as a site for most urban uses. The limitations affecting most recreational uses are slight. Because of the moderate amount of mica in the subsoil, compacting the soil is difficult on sites for embankments, dikes, and levees.

The capability subclass is IIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7C.

MbD2—Madison sandy clay loam, 8 to 15 percent slopes, eroded. This well drained soil is in the lower areas on narrow, convex side slopes. Individual areas are generally oblong and range from 7 to 40 acres in size.

Erosion has removed part of the original surface layer. The present surface layer is a mixture of the original surface layer and subsoil material. It is brown sandy clay loam 8 inches thick. The subsoil is 23 inches thick. The upper part is red clay, and the lower part is red clay loam. The underlying material to a depth of 60 inches is sandy loam.

Further erosion is a severe hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability and available water capacity are moderate. Because of a high content of clay in the surface layer, maintaining good tilth is difficult. When the surface is exposed, a crust forms after heavy rains. Also, clods form if the soil is worked when wet.

Included with this soil in mapping are a few small areas where the surface layer is sandy loam, a few areas that have rock fragments on the surface, and many areas that have a few shallow gullies. Also included are some small areas of Pacolet and Wilkes soils. Pacolet soils are in areas where acid crystalline rocks low in content of mica extend to the surface. Wilkes soils are on knobby points and shoulder slopes in areas underlain by mafic rocks. Included soils make up about 15 to 25 percent of the map unit.

Most areas are used as woodland. Some areas are used as pasture or cropland.

A few areas are used for corn, tobacco, or soybeans. The slope, surface runoff, and erosion are the main limitations. Conservation tillage and crop residue management help to control runoff and erosion. Sodded drainageways, terraces and diversions, stripcropping, field borders, contour farming, and crop rotations that include close-growing crops also conserve soil and water. A few areas are used for hay and pasture forage crops. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In forested areas shortleaf pine, Virginia pine, sweetgum, southern red oak, white oak, and maple are the main canopy trees. The understory species are flowering dogwood, cedar, holly, pin oak, sassafras, redbud, and black cherry. The high content of clay in the surface layer is the main limitation affecting woodland management.

This soil is moderately limited as a site for most urban and recreational uses. The slope and the clayey subsoil restrict some types of development. Because of the moderate amount of mica in the subsoil, compacting the soil is difficult on sites for embankments, dikes, and levees.

The capability subclass is VIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7C.

MbE2—Madison sandy clay loam, 15 to 25 percent slopes, eroded. This well drained soil is on convex, narrow side slopes. Individual areas are generally oblong and range from 7 to more than 50 acres in size.

Typically, the surface layer is eroded and is a mixture of subsoil and topsoil. It is brown sandy clay loam 8 inches thick. The subsoil is 23 inches thick. The upper part is red clay, and the lower part is red clay loam. The underlying material to a depth of 60 inches is red sandy loam.

Further erosion is a severe hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability and available water capacity are moderate.

Included with this soil in mapping are a few small areas where the surface layer is sandy loam or clay loam; a few areas that have rock fragments on the surface; some areas that have a few shallow gullies; and, especially on steep slopes along drainageways, some areas of soils that have less clay in the subsoil than the Madison soil. Also included are some small areas of Pacolet and Wilkes soils. Pacolet soils are in areas where acid crystalline rocks low in content of mica extend to the surface. Wilkes soils are in knobby,

highly dissected areas around drainageways underlain by mafic rocks. Included soils make up about 20 percent of the map unit.

Most areas are used as woodland. Some areas are used as pasture.

This soil generally is not used for cultivated crops. A few areas are used for hay and pasture forage crops. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In forested areas shortleaf pine, Virginia pine, sweetgum, southern red oak, and white oak are the main canopy trees. The understory species are flowering dogwood, eastern redcedar, holly, pin oak, sassafras, redbud, and black cherry. The slope and the high content of clay in the surface layer are the main limitations affecting woodland management.

This soil is severely limited as a site for most urban and recreational uses because of the slope.

The capability subclass is VIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7R.

McC2—Madison-Udorthents complex, 2 to 15 percent slopes, gullied. This map unit occurs as areas of a Madison soil and gullied Udorthents. It is about 40 to 50 percent Madison soil, 35 to 45 percent Udorthents, and 5 to 15 percent included soils.

The well drained Madison soil is on the ungullied parts of the landscape. Typically, the surface layer is eroded and is made up of red clay from the subsoil. In a few places the soil is not so eroded. In these places the surface layer is sandy clay loam or clay loam. Permeability and available water capacity are moderate.

The Udorthents consist of gullied areas where all or most of the natural soil layers have been removed. The exposed material is mainly saprolite of mica schist. The gullies range from about 3 to 15 feet in depth and from about 15 to 40 feet in width. They form a dendritic pattern throughout the map unit. Permeability of the saprolite material is slow, and available water capacity is very low.

Most areas are partly covered with vegetation. The principal plants are stunted Virginia pine, red maple, eastern redcedar, and scattered clumps of broomsedge and greenbrier. In bare areas further erosion is a hazard.

Major reclamation is required to control erosion and revegetate areas of this unit. The principal reclamation activities involve land filling and smoothing.

These soils are severely limited as sites for most uses. In their present state, they are best suited to wildlife habitat.

The Madison soil is in capability subclass VIIe. The Udorthents have not been assigned a capability subclass. This map unit has not been assigned a woodland ordination symbol.

MdB—Mayodan sandy loam, 2 to 8 percent slopes. This well drained soil is on broad, slightly convex ridges in the uplands. Individual areas are generally oblong and range from 7 to more than 100 acres in size.

Typically, the surface layer is yellowish red sandy loam 7 inches thick. The subsoil is 43 inches thick. The upper part is red clay. The lower part is red, mottled clay loam. The underlying material to a depth of 72 inches is mottled red, reddish yellow, and dark gray sandy loam.

Erosion is a moderate hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is medium. Permeability and available water capacity are moderate. Concentrations of aluminum in the subsoil may restrict the rooting depth. The shrink-swell potential is moderate.

Included with this soil in mapping are some small areas of soils that have slopes of more than 8 percent and a few small eroded areas where the surface layer is sandy clay loam. Also included are some small areas of Stoneville, Pinkston, and Ayersville soils. These soils are generally near the outer edge of the mapped areas. Included soils make up about 10 to 20 percent of the map unit.

Most areas are used as cropland or pasture. Some areas are used as woodland.

The major field crops are tobacco, corn, soybeans, and small grain. The most common horticultural crops are tomatoes, strawberries, sweet corn, green beans, and peas. The slope, surface runoff, and erosion are the main limitations in cultivated areas. Conservation tillage and crop residue management help to control runoff and erosion. Grassed waterways, terraces, contour farming, stripcropping, field borders, and crop rotations that include close-growing crops also conserve soil and water. Some areas are used for hay and pasture forage crops. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In convex forested areas, Virginia pine, shortleaf pine, southern red oak, black oak, white oak, sweetgum, and hickory are the major canopy trees. Yellow poplar is the main canopy tree in small concave areas at the head of drainageways. The understory species are flowering dogwood, sourwood, holly, black cherry, and sassafras. Few limitations affect woodland management.

This soil is moderately limited as a site for most urban uses. The limitations affecting most recreational uses are slight. The moderate permeability in the

subsoil may limit shallow excavations and some types of sanitary facilities. The moderate shrink-swell potential restricts building site development.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

MdD—Mayodan sandy loam, 8 to 15 percent slopes. This well drained soil is on slightly convex side slopes in the uplands. Individual areas are generally oblong and range from 7 to more than 80 acres in size.

Typically, the surface layer is yellowish red sandy loam 7 inches thick. The subsoil is 43 inches thick. The upper part is red clay. The lower part is red, mottled clay loam. The underlying material to a depth of 72 inches is multicolored saprolite that crushes to sandy loam.

Erosion is a severe hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability and available water capacity are moderate. Concentrations of aluminum in the subsoil may restrict the rooting depth. The shrink-swell potential is moderate.

Included with this soil in mapping are some small areas of soils that have slopes of more than 15 percent and a few small eroded areas where the surface layer is sandy clay loam. Also included are some small areas of Stoneville, Pinkston, and Ayersville soils. These soils are near the outer edge of the mapped areas. Included soils make up 10 to 20 percent of the map unit.

Most areas are used as cropland or pasture. Many areas are forested.

The major field crops are tobacco, corn, oats, and soybeans. The slope, surface runoff, and erosion are the main limitations. Conservation tillage and crop residue management help to control runoff and erosion. Grassed waterways, stripcropping, contour farming, field borders, and crop rotations that include close-growing crops also conserve soil and water. Hay and pasture forage crops are grown in a few areas. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In convex forested areas, Virginia pine, shortleaf pine, southern red oak, black oak, white oak, sweetgum, and hickory are the main canopy trees. Yellow poplar is the main canopy tree on concave slopes at the head of drainageways. The understory species are flowering dogwood, sourwood, holly, black cherry, and sassafras. Few limitations affect woodland management.

This soil is moderately limited as a site for most urban and some recreational uses. The slope, the moderate permeability, and the moderate shrink-swell potential are the main limitations.

The capability subclass is IVe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

MdE—Mayodan sandy loam, 15 to 25 percent slopes. This well drained soil is on convex side slopes. Individual areas are generally oblong and range from 7 to about 110 acres in size.

Typically, the surface layer is yellowish red sandy loam 7 inches thick. The subsoil is 43 inches thick. The upper part is red clay. The lower part is red, mottled clay loam. The underlying material to a depth of 72 inches is mottled red, reddish yellow, and dark gray sandy loam.

Erosion is a severe hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability and available water capacity are moderate. Concentrations of aluminum in the subsoil may restrict the rooting depth. The shrink-swell potential is moderate.

Included with this soil in mapping are a few small areas where the surface layer is sandy clay loam and a few areas that have rock fragments on the surface. Also included are a few small areas of Stoneville, Pinkston, and Ayersville soils. Included soils make up 15 to 25 percent of the map unit.

Most areas are used as woodland. Some areas are used as pasture or cropland.

This soil generally is not cultivated. The slope, surface runoff, and erosion are the main limitations affecting crop production. Some areas are used for hay or pasture forage crops. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In forested areas shortleaf pine, Virginia pine, sweetgum, southern red oak, and white oak are the main canopy trees. The understory species are flowering dogwood, cedar, holly, pin oak, sassafras, redbud, and black cherry. The slope is the main limitation affecting woodland management.

This soil is severely limited as a site for most urban and recreational uses because of the slope. Erosion is a hazard when the ground cover is removed.

The capability subclass is VIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8R.

MeB2—Mayodan sandy clay loam, 2 to 8 percent slopes, eroded. This well drained soil is on broad ridges in the uplands. Individual areas are generally oblong and range from 10 to about 300 acres in size.

Erosion has removed part of the original surface layer. The present surface layer is a mixture of the original surface layer and subsoil material. It is

yellowish red sandy clay loam 7 inches thick. The subsoil is 43 inches thick. It is red clay in the upper part and red, mottled clay loam in the lower part. The underlying material to a depth of 72 inches is mottled red, strong brown, reddish yellow, and dark gray sandy loam.

Further erosion is a moderate hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability and available water capacity are moderate. Concentrations of aluminum in the subsoil may restrict the rooting depth. Because of a high content of clay in the surface layer, maintaining good tilth is difficult. Also, large clods form if the soil is plowed when wet. The shrink-swell potential is moderate.

Included with this soil in mapping are a few small areas where the surface layer is sandy loam or clay loam and some areas where slopes are more than 8 percent. Also included are small areas of Stoneville, Pinkston, and Ayersville soils. These soils are generally near the outer edge of the mapped areas. Included soils make up about 10 to 25 percent of the map unit.

Most areas are used as cropland. Some areas are used as pasture or woodland.

The major field crops are tobacco, corn, soybeans, and small grain. The most common horticultural crops are tomatoes, sweet corn, and green beans. The slope, surface runoff, and erosion are the main limitations. Conservation tillage and crop residue management help to control runoff and erosion. Grassed waterways, terraces, field borders, contour farming, stripcropping, and crop rotations that include close-growing crops also conserve soil and water. Some areas are used for hay and pasture forage crops. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In convex forested areas, Virginia pine, shortleaf pine, southern red oak, black oak, white oak, sweetgum, and hickory are the main canopy trees. Yellow poplar is the main canopy tree in concave areas at the head of drainageways. The understory species are flowering dogwood, cedar, holly, pin oak, sassafras, and black cherry. Few limitations affect woodland management.

This soil is moderately limited as a site for most urban uses. The limitations that affect most recreational uses are slight. The clayey subsoil may limit shallow excavations and some types of sanitary facilities. The moderate shrink-swell potential limits building site development.

The capability subclass is IIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8C.

MeD2—Mayodan sandy clay loam, 8 to 15 percent slopes, eroded. This well drained soil is on narrow, convex side slopes. Individual areas are generally oblong and range from 7 to more than 75 acres in size.

Erosion has removed part of the original surface layer. The present surface layer is a mixture of the original surface layer and subsoil material. It is yellowish red sandy clay loam 7 inches thick. The subsoil is 43 inches thick. It is red clay in the upper part and red, mottled clay loam in the lower part. The underlying material to a depth of 72 inches is red, reddish yellow, and dark gray sandy loam.

Erosion is a severe hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability and available water capacity are moderate. Concentrations of aluminum in the subsoil may restrict the rooting depth. Because of a high content of clay in the surface layer, maintaining good tilth is difficult. Also, large clods form if the soil is plowed when wet. The shrink-swell potential is moderate.

Included with this soil in mapping are some small areas where the surface layer is sandy loam or clay loam, a few areas that have rock fragments on the surface, and some areas that have a few shallow gullies. Also included are a few small areas of Stoneville, Pinkston, and Ayersville soils. These soils are along the outer edge of the mapped areas. Included soils make up about 10 to 25 percent of the map unit.

Most areas are used as woodland. Some areas are used as pasture or cropland.

The principal crops are corn, tobacco, and soybeans. The slope, surface runoff, and erosion are the main limitations. Conservation tillage and crop residue management help to control runoff and erosion. Grassed waterways, terraces and diversions, stripcropping, field borders, contour farming, and crop rotations that include close-growing crops also conserve soil and water. A few areas are used for hay and pasture forage crops. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In convex forested areas, shortleaf pine, Virginia pine, sweetgum, southern red oak, white oak, and hickory are the main canopy trees. Yellow poplar is the main canopy tree in concave areas at the head of drainageways. The understory species are flowering dogwood, cedar, holly, pin oak, sassafras, redbud, and black cherry. Few limitations affect woodland management.

The slope, the moderate shrink-swell potential, and the moderate permeability are moderate limitations affecting most urban and recreational uses.

The capability subclass is VIe. Based on loblolly pine

as the indicator species, the woodland ordination symbol is 8C.

MeE2—Mayodan sandy clay loam, 15 to 25 percent slopes, eroded. This well drained soil is on convex side slopes. Individual areas are generally oblong and range from 7 to about 100 acres in size.

Typically, the surface layer is eroded and is a mixture of topsoil and subsoil. It is yellowish red sandy clay loam 7 inches thick. The subsoil is 43 inches thick. It is red clay in the upper part and red, mottled clay loam in the lower part. The underlying material to a depth of 72 inches is mottled red, reddish yellow, and dark gray sandy loam.

Erosion is a severe hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability and available water capacity are moderate. Concentrations of aluminum in the subsoil may restrict the rooting depth. The shrink-swell potential is moderate.

Included with this soil in mapping are a few small areas where the surface layer is sandy loam or clay loam and some areas that have a few shallow gullies. Also included, on bluffs along the major streams, are small areas of Stoneville, Pinkston, and Ayersville soils. Included soils make up about 10 to 20 percent of the map unit.

Most areas are used as woodland. Some areas are used as cropland or pasture.

This soil generally is not cultivated. The slope, surface runoff, and erosion are the main limitations. Some areas are used for hay and pasture forage crops. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In forested areas shortleaf pine, Virginia pine, sweetgum, southern red oak, and white oak are the main canopy trees. The understory species are flowering dogwood, cedar, holly, pin oak, sassafras, redbud, and black cherry. The slope is the main limitation affecting woodland management.

This soil is severely limited as a site for most urban and recreational uses because of the slope. Erosion is a hazard when the ground cover is removed.

The capability subclass is VIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8R.

MfC—Mayodan-Urban land complex, 2 to 10 percent slopes. This map unit occurs as areas of a Mayodan soil and Urban land. It is about 50 percent Mayodan soil, 35 percent Urban land, and 15 percent included soils. Most areas are irregular in shape and range from 10 to more than 100 acres in size.

Typically, the surface layer of the Mayodan soil is yellowish red sandy loam 7 inches thick. The subsoil is 43 inches thick. The upper part is red clay. The lower part is red, mottled clay loam. The underlying material to a depth of 72 inches is mottled red, reddish yellow, and dark gray sandy loam.

The Urban land is in areas where the original soil has been cut, filled, graded, or paved. Soil properties have been so altered that the original soil cannot be recognized. This land is used for buildings of all types, streets, parking lots, or other structures in areas where buildings are closely spaced or the soil is covered with pavement. The extent of site modification varies greatly. Many areas have undergone little disturbance, but many areas have been extensively cut or filled.

Included in mapping are a few areas of Pinkston and Ayersville soils. These soils are in sloping areas and on bluffs near streams. Also included are areas of Stoneville soils.

The rate of surface runoff on this map unit is higher than it is on other Mayodan soils because the areas are covered by buildings, streets, parking lots, and other impermeable material. The moderate permeability and moderate shrink-swell potential of the Mayodan soil are the main limitations affecting most urban uses.

This unit has not been assigned a capability subclass or a woodland ordination symbol.

MkB2—Mecklenburg sandy clay loam, 2 to 8 percent slopes, eroded. This well drained soil is on slightly convex, broad ridges in the uplands. Individual areas are generally oblong and range from 7 to more than 50 acres in size.

Erosion has removed part of the original surface layer. The present surface layer is a mixture of the original surface layer and subsoil material. It is yellowish red sandy clay loam 7 inches thick. The subsoil is 23 inches thick. It is yellowish red clay in the upper part and yellowish red clay loam in the lower part. The underlying material extends to a depth of 72 inches. It is yellowish red and white sandy clay loam in the upper part and yellowish red and black sandy loam in the lower part.

Further erosion is a moderate hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is medium. Permeability is slow. Available water capacity is moderate. The shrink-swell potential also is moderate. The depth to bedrock is more than 4 feet. Tillage is restricted after heavy rains. Surface clods form readily if the soil is worked when wet.

Included with this soil in mapping are a few small areas of Mecklenburg soils that have a surface layer of sandy loam, loam, or clay loam; a few small areas of

soils having a subsoil that is thicker than that of the Mecklenburg soil; and a few small areas of soils that have gravel-sized fragments in the surface layer. Also included are small areas of Cecil soils and some areas of Iredell soils in the lower depressions. Included soils make up about 15 to 25 percent of the map unit.

Most areas are used as cropland or pasture. Some areas are wooded.

The major field crops are corn, soybeans, tobacco, and small grain. The most common horticultural crops are tomatoes, sweet corn, green beans, and peas. The slope and erosion are the main limitations affecting crop production. Conservation tillage and crop residue management help to control runoff and erosion. Grassed waterways, terraces and diversions, field borders, stripcropping, and crop rotations that include close-growing crops also conserve soil and water. Some areas are used for hay and pasture. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In forested areas Virginia pine, eastern redcedar, shortleaf pine, and southern red oak are the main canopy trees. The understory species are flowering dogwood, cedar, sourwood, redbud, black cherry, and sassafras. Few limitations affect woodland management.

This soil has severe or moderate limitations as a site for most urban uses and moderate limitations as a site for most recreational uses. The clayey subsoil and the slow permeability limit shallow excavations and some types of sanitary facilities.

The capability subclass is IIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 6C.

PaD—Pacolet sandy loam, 8 to 15 percent slopes. This well drained soil is on narrow, convex side slopes. Individual areas are generally oblong and irregular in width and are commonly less than 40 acres in size.

Typically, the surface layer is brown sandy loam 2 inches thick. The subsurface layer is dark yellowish brown sandy loam 4 inches thick. The subsoil is 29 inches thick. In sequence downward, it is yellowish red sandy clay loam, red clay loam, red clay, and red sandy clay loam. The underlying material to a depth of 60 inches is red saprolite that crushes to sandy loam.

Erosion is a severe hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability is moderate, and available water capacity is low or moderate. The depth to bedrock is more than 60 inches.

Included with this soil in mapping are a few small areas where the surface layer is sandy clay loam or clay loam and a few areas that have rock fragments on the surface. Also included are a few small areas of Cecil, Madison, and Wilkes soils. Cecil soils are on the more uniform, less sloping parts of the landscape. Madison soils are in small areas underlain by mica schist. They have a higher content of mica in the subsoil than the Pacolet soil. The shallow Wilkes soils are on the knobby, more irregular parts of the landscape. They are underlain by mixed acid and basic crystalline rocks. Included soils make up about 10 to 25 percent of the map unit.

Most areas are used as woodland. A few areas are used as cropland or pasture.

In the few areas that are cultivated, the principal crops are corn, tobacco, and soybeans. The slope, surface runoff, and erosion are the main limitations affecting crop production. Conservation tillage and crop residue management help to control runoff and erosion. Grassed waterways, terraces and diversions, stripcropping, field borders, contour farming, and crop rotations that include close-growing crops also conserve soil and water. Some areas are used for hay and pasture forage crops. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In forested areas shortleaf pine, Virginia pine, sweetgum, southern red oak, white oak, and maple are the main canopy trees. The understory species are flowering dogwood, eastern redcedar, holly, pin oak, sassafras, redbud, and black cherry. Few limitations affect woodland management.

This soil is moderately limited as a site for most urban and recreational uses, mainly because of the slope and the moderate permeability.

The capability subclass is IVe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

PaE—Pacolet sandy loam, 15 to 25 percent slopes. This well drained soil is on narrow, convex side slopes. Individual areas are generally oblong and irregular in width and are commonly less than 50 acres in size.

Typically, the surface layer is brown sandy loam 2 inches thick. The subsurface layer is dark yellowish brown sandy loam 4 inches thick. The subsoil is 29 inches thick. In sequence downward, it is yellowish red sandy clay loam, red clay loam, red clay, and red sandy clay loam. The underlying material to a depth of 60 inches is red saprolite that crushes to sandy loam.

Erosion is a severe hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability is moderate, and available water capacity is low or moderate. The depth to bedrock is more than 60 inches.

Included with this soil in mapping are a few small

areas where the surface layer is sandy clay loam and a few areas that have rock fragments on the surface. Also included are a few small areas of Madison and Wilkes soils. Madison soils have a higher content of mica in the subsoil than the Pacolet soil. The shallow Wilkes soils are in the more knobby, more irregular areas. They are underlain by mixed acid and basic rocks. Included soils make up 15 to 30 percent of the map unit.

Most areas are used as woodland. Some areas are used as cropland or pasture.

The major field crops are corn and soybeans. If cultivated, this soil is subject to excessive erosion because of the slope and surface runoff. Hay and pasture crops are grown in a few areas. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In forested areas shortleaf pine, Virginia pine, sweetgum, southern red oak, and white oak are the main canopy trees. The understory species are flowering dogwood, eastern redcedar, holly, pin oak, sassafras, redbud, and black cherry. The slope is the main limitation affecting woodland management.

This soil is severely limited as a site for most urban and recreational uses because of the slope. Erosion is a hazard when the ground cover is removed.

The capability subclass is VIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8R.

PaF—Pacolet sandy loam, 25 to 40 percent slopes. This well drained soil is on narrow, convex side slopes and bluffs along the major creeks and rivers. Individual areas are generally oblong and irregular in width and are commonly less than 75 acres in size.

Typically, the surface layer is brown sandy loam 2 inches thick. The subsurface layer is dark yellowish brown sandy loam 4 inches thick. The subsoil is 29 inches thick. In sequence downward, it is yellowish red sandy clay loam, red clay loam, red clay, and red sandy clay loam. The underlying material to a depth of 60 inches is red saprolite that crushes to sandy loam.

Erosion is a severe hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability is moderate, and available water capacity is low or moderate. The depth to bedrock is more than 60 inches.

Included with this soil in mapping are a few small areas where the surface layer is sandy clay loam or clay loam and a few areas that have rock fragments on the surface. Also included are a few small areas of Wateree, Rion, Madison, and Wilkes soils. Wateree and Rion soils are on the steeper bluffs adjacent to streams. Madison soils have a higher content of mica in the subsoil than the Pacolet soil. They are in areas underlain by mica schist. The shallow Wilkes soils are in areas underlain by mixed acid and basic crystalline rocks. Included soils make up about 20 to 35 percent of the map unit.

Most areas are used as woodland. Some areas are used as pasture.

This soil generally is not used for cultivated crops because of the slope. Some areas are used for hay and pasture. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In forested areas shortleaf pine, Virginia pine, sweetgum, southern red oak, white oak, and maple are the main canopy trees. The understory includes flowering dogwood, eastern redcedar, holly, pin oak, sassafras, and black cherry. The slope is the main limitation affecting woodland management.

The slope is a severe limitation affecting most urban and recreational uses.

The capability subclass is VIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8R.

PcD2—Pacolet sandy clay loam, 8 to 15 percent slopes, eroded. This well drained soil is on long, narrow, convex side slopes. Individual areas are generally oblong and irregular in width. They are commonly less than 60 acres in size, but some are more than 150 acres in size.

Erosion has removed part of the original surface layer. The present surface layer is a mixture of the original surface layer and subsoil material. It is brown sandy clay loam 6 inches thick. The subsoil is 29 inches thick. The upper part is red sandy clay loam, the next part is red clay, and the lower part is red sandy clay loam. The underlying material to a depth of 60 inches is red saprolite that crushes to sandy loam.

Further erosion is a severe hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability is moderate, and available water capacity is low or moderate. The depth to bedrock is more than 60 inches. Because of a high content of clay in the surface layer, maintaining good tilth is difficult. When the surface is exposed, a crust forms after heavy rains. Also, clods form if the soil is worked when wet.

Included with this soil in mapping are a few small areas where the surface layer is sandy loam or clay loam, a few areas that have rock fragments on the surface, and some areas that have a few shallow gullies. Also included are a few small areas of Cecil, Madison, and Wilkes soils. Cecil soils are commonly on the less sloping parts of the landscape. Their subsoil is thicker than that in the Pacolet soil. Madison soils are in

areas that are underlain by mica schist. They have a higher content of mica in the subsoil than the Pacolet soil. The shallow Wilkes soils are on the more knobby, more irregular parts of the landscape. They are underlain by mixed acid and basic crystalline rocks. Included soils make up about 10 to 25 percent of the map unit.

Most areas are used as woodland. A few areas are used as pasture or cropland.

The principal cultivated crops are corn, tobacco, and soybeans. The slope, surface runoff, and erosion are the main limitations affecting crop production. Conservation tillage and crop residue management help to control runoff and erosion. Sodded drainageways, terraces and diversions, stripcropping, field borders, contour farming, and crop rotations that include close-growing crops also conserve soil and water. Some areas are used for hay and pasture. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In forested areas shortleaf pine, Virginia pine, sweetgum, southern red oak, white oak, and maple are the main canopy trees. The understory species are flowering dogwood, eastern redcedar, holly, pin oak, sassafras, redbud, and black cherry. The high content of clay in the surface layer is the main limitation affecting woodland management.

This soil is moderately limited as a site for most urban and recreational uses, mainly because of the slope and the clayey subsoil.

The capability subclass is VIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 6C.

PcE2—Pacolet sandy clay loam, 15 to 25 percent slopes, eroded. This well drained soil is on narrow, convex side slopes. Individual areas are generally oblong and irregular in width and are commonly less than 100 acres in size.

Typically, the surface layer is eroded and is a mixture of subsoil and topsoil material. It is brown sandy clay loam 6 inches thick. The subsoil is 29 inches thick. It is red sandy clay loam in the upper part, red clay in the next part, and red sandy clay loam in the lower part. The underlying material to a depth of 60 inches is red saprolite that crushes to sandy loam.

Further erosion is a severe hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability is moderate, and available water capacity is low or moderate. The depth to bedrock is more than 60 inches.

Included with this soil in mapping are a few small areas where the surface layer is sandy loam, a few areas that have rock fragments on the surface, and some areas that have a few shallow gullies. Also included are a few small areas of Madison and Wilkes soils. Madison soils have more mica in the subsoil than the Pacolet soil because they are underlain by mica schist. The shallow Wilkes soils are on the more knobby, more irregular parts of the landscape. They are underlain by mixed acid and basic crystalline rocks. Included soils make up about 15 to 30 percent of the map unit.

Most areas are used as woodland. Some areas are used as cropland or pasture.

Cultivated crops are generally not grown on this soil. The slope, surface runoff, and erosion are the main limitations affecting crop production. Some areas are used for hay and pasture. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In forested areas shortleaf pine, Virginia pine, sweetgum, southern red oak, and white oak are the main canopy trees. The understory species are flowering dogwood, eastern redcedar, holly, pin oak, sassafras, redbud, and black cherry. The slope is the main limitation affecting woodland management.

This soil is severely limited as a site for most urban and recreational uses because of the slope. Erosion is a hazard when the ground cover is removed.

The capability subclass is VIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 6C.

PnC—Pinkston fine sandy loam, 6 to 15 percent slopes. This well drained to excessively drained soil is on convex shoulder slopes, narrow ridges, and side slopes. Individual areas are generally oblong and range from 7 to about 30 acres in size.

Typically, the surface layer is dark reddish gray fine sandy loam 5 inches thick. The subsoil is reddish brown gravelly sandy loam 11 inches thick. The underlying material is reddish brown very gravelly sandy loam. Hard sandstone is at a depth of 23 inches.

Erosion is a severe hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability is moderately rapid, and available water capacity is low. The depth to hard bedrock ranges from 20 to 40 inches.

Included with this soil in mapping are a few areas of soils that have a surface layer of gravelly silt loam and a few areas that have gravel and stones on the surface. Also included are some small areas of Mayodan soils on the less sloping parts of the landscape and some areas of Stoneville soils, which are underlain by siltstone. Included soils make up about 10 to 20 percent of the map unit.

Most areas are used as woodland. Some small areas

are used as pasture or cropland.

This soil generally is not used for cultivated crops. The slope, erosion, the depth to bedrock, and a limited amount of moisture during dry periods are the main limitations. Conservation tillage and crop residue management help to control runoff and erosion. Grassed waterways, terraces and diversions, stripcropping, field borders, contour farming, and crop rotations that include close-growing crops also conserve soil and water. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In forested areas white oak, black oak, post oak, southern red oak, hickory, maple, shortleaf pine, and Virginia pine are the main canopy trees. The understory species are flowering dogwood, holly, sourwood, black cherry, redbud, and sassafras. A restricted rooting depth and the low available water capacity are the main limitations affecting woodland management.

This soil is severely limited as a site for most urban uses and is moderately limited as a site for most recreational uses, mainly because of the depth to bedrock and the slope.

The capability subclass is IVe. Based on southern red oak as the indicator species, the woodland ordination symbol is 3D.

PnF—Pinkston fine sandy loam, 15 to 45 percent slopes. This well drained to excessively drained soil is on very steep, convex side slopes. Individual areas are generally oblong and range from 7 to about 60 acres in size.

Typically, the surface layer is dark reddish gray fine sandy loam 5 inches thick. The subsoil is reddish brown gravelly sandy loam 11 inches thick. The underlying material is reddish brown very gravelly sandy loam. Hard sandstone is at a depth of 23 inches.

Erosion is a severe hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability is moderately rapid, and available water capacity is low. The depth to hard bedrock ranges from 20 to 40 inches.

Included with this soil in mapping are a few small areas of soils that have a surface layer of gravelly silt loam and a few areas that have gravel and stones on the surface. Also included are some small areas of Mayodan and Stoneville soils. Mayodan soils have a subsoil that is thicker than that of the Pinkston soil. Stoneville soils are in areas underlain by siltstone. Included soils make up about 15 to 25 percent of the map unit.

Most areas are used as woodland. Some areas are used as pasture or cropland.

Cultivated crops are generally not grown on this soil because of the slope. Hay and pasture are grown in some areas. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In forested areas white oak, black oak, post oak, southern red oak, sweetgum, hickory, maple, shortleaf pine, and Virginia pine are the main canopy trees. The understory species are flowering dogwood, holly, sourwood, black cherry, redbud, and sassafras. A limited rooting depth and the slope are the main limitations affecting woodland management.

This soil is severely limited as a site for most urban and recreational uses because of the slope and the depth to hard bedrock.

The capability subclass is VIIe. Based on southern red oak as the indicator species, the woodland ordination symbol is 3D.

Pt—Pits, clay. This map unit consists of areas where all of the natural soil has been removed and used in the manufacture of bricks. The pits are excavated areas that consist of vertical side walls, relatively smooth bottoms, and mounds of spoil material. The excavations are 6 to more than 30 feet deep. Most areas are irregular in shape and are as much as 70 acres in size.

Where mining is still in progress, this unit is generally unvegetated, except for a few Virginia pine. Erosion is a hazard, and instability results in gullying and siltation. Most sediments are trapped onsite. Small areas of water are included in some of the pits.

The exposed soil material commonly has poor physical properties. These properties restrict plant growth. The root zone generally is shallow. Available water capacity, fertility, and organic matter content are low. Reseeded areas have potential as wildlife habitat. Recommendations for reclamation and use of this unit require onsite examination.

This unit has not been assigned a capability subclass or a woodland ordination symbol.

Qu—Pits, quarries. This map unit consists of areas where the soil has been removed and the underlying rock material has been mined and crushed for use as road base. These areas are 4 to 100 acres in size.

The pits are excavated areas that have vertical side walls and scattered, small mounds of rock rubble on the floors. The excavations are as much as 175 feet deep. Some mounds of rock rubble are adjacent to the pits. Small areas of water are in some of the pits.

The exposed rock rubble cannot support significant plant growth. Recommendations for reclamation and use of this unit require onsite examination.

This unit has not been assigned a capability subclass or a woodland ordination symbol.

RnB—Rion sandy loam, 2 to 8 percent slopes. This well drained soil is on narrow ridges in the uplands. Individual areas are generally oblong and range from 7 to about 50 acres in size.

Typically, the surface layer is yellowish brown sandy loam 10 inches thick. The subsoil is strong brown, mottled sandy clay loam 24 inches thick. The underlying material extends to a depth of 60 inches. It is strong brown, mottled sandy loam in the upper part and yellow loamy sand in the lower part.

Erosion is a moderate hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is medium. Permeability and available water capacity are moderate. The soil can be worked throughout a fairly wide range in moisture content.

Included with this soil in mapping are some small areas of Cecil, Helena, Vance, Wateree, and Wilkes soils. Cecil soils are generally on the smoother parts of the landscape. Helena soils are in concave areas around the head of and along intermittent drainageways. Vance soils are generally in the more eroded spots. Wateree soils are in areas near bedrock outcrops. Wilkes soils are in areas underlain by basic bedrock, generally on points near intermittent drainageways. Included soils make up about 10 to 25 percent of the map unit.

Most areas are used as cropland. Some small areas are used as pasture or woodland.

The major field crops are tobacco, corn, soybeans, and small grain. The most common horticultural crops are tomatoes, strawberries, sweet corn, green beans, and peas. The slope, surface runoff, and erosion are the main limitations in cultivated areas. Conservation tillage and crop residue management help to control runoff and erosion. Sodded drainageways, terraces and diversions, contour farming, stripcropping, field borders, and crop rotations that include close-growing crops also conserve soil and water. Some areas are used for hay and pasture forage crops. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In convex forested areas, Virginia pine, shortleaf pine, southern red oak, black oak, white oak, sweetgum, and hickory are the major canopy trees. Yellow poplar is the main canopy tree in small concave areas at the head of drainageways. The understory species are flowering dogwood, sourwood, holly, black cherry, and sassafras. Few limitations affect woodland management.

The limitations that affect most urban and recreational uses are slight. Seepage may be a problem on sites for some types of sanitary facilities.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

RnD—Rion sandy loam, 8 to 15 percent slopes. This well drained soil is on narrow, convex side slopes in the uplands. Individual areas are generally oblong and range from 7 to about 50 acres in size.

Typically, the surface layer is yellowish brown sandy loam 10 inches thick. The subsoil is strong brown, mottled sandy clay loam 24 inches thick. The underlying material extends to a depth of 60 inches. It is strong brown, mottled sandy loam in the upper part and yellow loamy sand in the lower part.

Erosion is a severe hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability and available water capacity are moderate.

Included with this soil in mapping are some small, commonly eroded areas of Vance soils. Also included are small areas of Pacolet, Wateree, and Wilkes soils. Pacolet soils are in the smoother, less dissected areas. Wateree soils are on short bluffs along intermittent drainageways. Wilkes soils are in areas underlain by basic bedrock. Included soils make up about 15 to 25 percent of the map unit.

Most areas are used as woodland. Some small areas are used as pasture or cropland.

The main crops are tobacco, corn, oats, and soybeans. The slope, surface runoff, and erosion are the main limitations in cultivated areas. Conservation tillage and crop residue management help to control runoff and erosion. Sodded drainageways, terraces and diversions, stripcropping, contour farming, field borders, and crop rotations that include close-growing crops also conserve soil and water. Hay and pasture forage crops are grown in some areas. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In convex forested areas, Virginia pine, shortleaf pine, southern red oak, black oak, white oak, sweetgum, and hickory are the main canopy trees. Yellow poplar is the main canopy species in small concave areas at the head of drainageways. The understory species are flowering dogwood, sourwood, holly, black cherry, and sassafras. Few limitations affect woodland management.

This soil is moderately limited as a site for most urban and some recreational uses. Seepage is a problem on sites for some types of sanitary facilities.

The capability subclass is IVe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

RnE—Rion sandy loam, 15 to 30 percent slopes. This well drained soil is on narrow, convex side slopes in the uplands. Individual areas are generally oblong and range from 7 to about 50 acres in size.

Typically, the surface layer is yellowish brown sandy loam 10 inches thick. The subsoil is strong brown, mottled sandy clay loam 24 inches thick. The underlying material extends to a depth of 60 inches. It is strong brown, mottled sandy loam in the upper part and yellow loamy sand in the lower part.

Erosion is a severe hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability and available water capacity are moderate.

Included with this soil in mapping are some small areas of Wateree, Pacolet, and Wilkes soils. Wateree soils are on short bluffs. Pacolet soils are in the smoother, less dissected areas. Wilkes soils are in areas underlain by basic bedrock. Included soils make up about 10 to 20 percent of the map unit.

Most areas are used as woodland. Some small areas are used as pasture or cropland.

This soil generally is not used for cultivated crops. The slope, surface runoff, and erosion are the main limitations affecting crop production. Hay and pasture forage crops are grown in a few areas. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In forested areas shortleaf pine, Virginia pine, sweetgum, southern red oak, black oak, white oak, and hickory are the main canopy trees. The understory species are flowering dogwood, cedar, holly, pin oak, sassafras, redbud, and black cherry. The slope is the main limitation affecting woodland management.

This soil is severely limited as a site for most urban and recreational uses because of the slope. Erosion is a hazard when the ground cover is removed.

The capability subclass is VIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8R.

RoC—Rion-Urban land complex, 2 to 10 percent slopes. This map unit occurs as intermingled areas of a well drained Rion soil and Urban land. It is about 50 percent Rion soil, 35 percent Urban land, and 15 percent included soils. Most areas are irregular in shape and are as much as 100 acres in size.

The Rion soil is in the open, relatively undisturbed areas. Typically, the surface layer is yellowish brown fine sandy loam 10 inches thick. The subsoil is strong brown, mottled sandy clay loam 24 inches thick. The underlying material extends to a depth of 60 inches. It is strong brown, mottled sandy loam in the upper part and yellow loamy sand in the lower part.

The Urban land has an impervious surface. It is covered with shopping centers, factories, municipal buildings, houses, apartments, parking lots, and roads. Slopes generally have been modified as needed during development. The extent of site modification varies. Some areas have undergone little disturbance, but others have been reshaped through extensive cutting, grading, and land filling.

Included in mapping are a few areas of Cecil, Iredell, Vance, and Wilkes soils. Cecil, Iredell, and Vance soils are clayey. Iredell and Wilkes soils are underlain by basic bedrock.

Few limitations affect urban development on the Rion soil, although seepage is a limitation on sites for some types of sanitary facilities. Surface runoff on the Urban land greatly exceeds that on the Rion soil. Recommendations for use and management of this map unit generally require onsite investigation.

This unit has not been assigned a capability subclass or a woodland ordination symbol.

SeB—Sedgefield sandy loam, 2 to 8 percent slopes. This moderately well drained or somewhat poorly drained soil is in small concave areas around the head of drainageways and in swales on uplands. It commonly receives surface runoff from the adjacent soils. Individual areas are generally oblong or oval and range from 7 to about 30 acres in size.

Typically, the surface layer is dark grayish brown sandy loam 4 inches thick. The subsoil is 31 inches thick. The upper part is brownish yellow sandy clay loam. The next part is yellowish brown, mottled clay. The lower part is yellowish brown, mottled clay loam. The underlying material to a depth of 60 inches is multicolored saprolite that crushes to sandy loam.

Erosion is a moderate hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is medium. Permeability is slow, and available water capacity is moderate. The shrink-swell potential is high. During wet periods the soil has a perched water table as a result of the slowly permeable subsoil. The soil dries slowly after heavy rains.

Included with this soil in mapping are some small areas where the surface layer is gravelly sandy loam and a few small eroded areas where it is sandy clay. Also included are a few small areas of Appling and Cecil soils on the higher parts of the landscape and small areas of Iredell soils. Included soils make up 10 to 25 percent of the map unit.

Most areas are used as cropland. Some areas are used as pasture or woodland.

The principal crops are tobacco, corn, milo, and

Figure 9.—Stripcropping, contour farming, and grass-based rotations in an area of Sedgefield sandy loam, 2 to 8 percent slopes.

small grain. Horticultural crops, such as tomatoes, cucumbers, cantaloupes, sweet corn, green beans, and peas, are grown in some areas. The slope and the wetness are the main limitations affecting crop production. Conservation tillage and crop residue management help to control runoff and erosion. Sodded drainageways, field borders, stripcropping, contour farming, and crop rotations that include close-growing crops also conserve soil and water (fig. 9). Some areas are used for hay and pasture. Proper pasture management helps to maintain a protective plant cover and helps to control runoff and erosion.

In forested areas yellow poplar, white oak, black oak, post oak, southern red oak, crimson oak, sweetgum, hickory, maple, blackjack oak, willow oak, eastern redcedar, chestnut oak, Virginia pine, and shortleaf pine are the main canopy trees. The understory species are flowering dogwood, holly, sourwood, redbud, black cherry, and sassafras. The wetness is the main limitation affecting woodland management.

The wetness, the slow permeability, and the high shrink-swell potential are severe limitations on sites for most urban and recreational uses.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8W.

SpB—Spray loam, 0 to 5 percent slopes. This well drained soil is in smooth to convex areas on broad ridges in the uplands. Individual areas are generally oblong and range from 7 to about 50 acres in size.

Typically, the surface layer is dark brown loam 6 inches thick. The subsoil is reddish brown clay 11 inches thick. The underlying material to a depth of 60

inches is reddish brown saprolite of shale that crushes to extremely channery silt loam.

Erosion is a moderate hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is medium. Permeability is moderate, and available water capacity is low. The shrink-swell potential is moderate.

Included with this soil in mapping are a few small eroded areas where the surface layer is clay loam and some areas where gravel is on the surface. Also included are some small areas of Leaksville soils on the lower or more depressional parts of the landscape and small areas of Ayersville soils on some of the more dissected parts. Included soils make up about 15 to 30 percent of the map unit.

Most areas are used as pasture. Some small areas are used for cropland, woodland, or industrial development.

The main cultivated crops are corn, small grain, sorghum, and soybeans. Conservation tillage and crop residue management aid in controlling runoff and erosion. Sodded drainageways, stripcropping, field borders, contour farming, and crop rotations that include close-growing crops also conserve soil and water. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In forested areas Virginia pine, shortleaf pine, white oak, willow oak, red maple, shagbark hickory, southern red oak, sweetgum, and eastern redcedar are the main canopy trees. Understory species include red maple, winged elm, redbud, and flowering dogwood. Few limitations affect woodland management.

The limitations that affect most urban and recreational uses are slight.

The capability subclass is IIe. Based on Virginia pine as the indicator species, the woodland ordination symbol is 6A.

SuB—Spray-Urban land complex, 0 to 5 percent slopes. This map unit occurs as intermingled areas of a well drained Spray soil and Urban land. It is about 45 to 60 percent Spray soil, 30 to 40 percent Urban land, and 10 to 25 percent included soils.

The Spray soil is in the open, relatively undisturbed areas. Typically, the surface layer is dark brown loam 6 inches thick. The subsoil is reddish brown clay 11 inches thick. The underlying material to a depth of 60 inches is reddish brown saprolite of shale that crushes to extremely channery silt loam.

The Urban land has an impervious surface. It is covered with shopping centers, factories, municipal buildings, houses, apartment complexes, parking lots, and roads. Slopes generally have been modified as needed during development. The extent of site modification varies greatly. Many areas have undergone little disturbance, while other areas have been extensively cut or filled.

Included in mapping are a few areas of Leaksville soils on the lower concave parts of the landscape and Ayersville soils on the more dissected parts. Also included are open areas where extensive grading and filling have disturbed all or most of the natural soil layers.

The limitations affecting most urban uses on the Spray soil are slight. Surface runoff on the Urban land greatly exceeds that on the Spray soil. Recommendations for use and management of this map unit generally require onsite investigation.

This map unit has not been assigned a capability subclass or a woodland ordination symbol.

SvB—Stoneville loam, 2 to 8 percent slopes. This well drained soil is on broad ridges. Individual areas are generally oblong and range from 5 to more than 75 acres in size.

Typically, the surface layer is dark reddish brown loam 5 inches thick. The subsoil is 33 inches thick. The upper part is dark reddish brown loam. The next part is dark reddish brown clay. The lower part is dark reddish brown clay loam. The underlying material is dark reddish brown loam. Soft bedrock is at a depth of 48 inches.

Erosion is a moderate hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is medium. Permeability and available water capacity are moderate. The shrink-swell potential also is moderate. The depth to soft bedrock ranges from 40 to 60 inches.

Included with this soil in mapping are a few small eroded areas where the surface layer is silty clay loam and some areas where slopes are slightly more than 8 percent. Also included are some small areas of Mayodan and Ayersville soils. Mayodan soils are on the more concave parts of the landscape. Ayersville soils are on narrow ridges in the more dissected areas along steep river bluffs. Included soils make up 15 to 25 percent of the map unit.

Most areas are used as woodland. Some small areas are used as cropland or pasture.

The most common cultivated crops are corn, soybeans, and small grain. The slope, surface runoff, and erosion are the main limitations affecting crop production. Conservation tillage and crop residue management aid in controlling runoff and erosion. Sodded drainageways, field borders, stripcropping, and crop rotations that include close-growing crops also conserve soil and water. Some areas are used for hay

and pasture. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In convex forested areas, white oak, black oak, post oak, southern red oak, crimson oak, sweetgum, hickory, maple, white ash, American beech, shortleaf pine, and Virginia pine are the main canopy trees. Yellow poplar is the main canopy species in small concave areas at the head of drainageways. The understory species are flowering dogwood, sourwood, holly, redbud, and sassafras. Few limitations affect woodland management.

The moderate shrink-swell potential, the moderate permeability, and the depth to bedrock are the main limitations affecting most urban and recreational uses.

The capability subclass is IIe. Based on shortleaf pine as the indicator species, the woodland ordination symbol is 8A.

SvD—Stoneville loam, 8 to 15 percent slopes. This well drained soil is on narrow, convex side slopes. Individual areas are generally oblong and range from 7 to about 75 acres in size.

Typically, the surface layer is dark reddish brown loam 5 inches thick. The subsoil is 33 inches thick. The upper part is dark reddish brown loam. The next part is dark reddish brown clay. The lower part is dark reddish brown clay loam. The underlying material is dark reddish brown loam. Soft bedrock is at a depth of 48 inches.

Erosion is a severe hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability and available water capacity are moderate. The shrink-swell potential also is moderate. The depth to soft bedrock ranges from 40 to 60 inches.

Included with this soil in mapping are a few small eroded areas where the surface layer is silty clay loam and some areas where slopes are slightly more than 15 percent. Also included are some small areas of Mayodan and Ayersville soils. Mayodan soils are on the more concave parts of the landscape. Ayersville soils are on narrow ridges in the more dissected areas along steep river bluffs. Included soils make up about 15 to 30 percent of the map unit.

Most areas are used as woodland. Some small areas are used as cropland or pasture.

The most common cultivated crops are corn, soybeans, and small grain. Conservation tillage and crop residue management aid in controlling runoff and erosion. Sodded drainageways, field borders, stripcropping, and crop rotations that include close-growing crops also conserve soil and water. Some areas are used for hay and pasture. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In convex forested areas, white oak, black oak, post oak, southern red oak, crimson oak, sweetgum, hickory, maple, white ash, American beech, shortleaf pine, and Virginia pine are the main canopy trees. Yellow poplar is the main canopy tree in small concave areas around the head of drainageways. The understory species are flowering dogwood, sourwood, holly, redbud, and sassafras. Few limitations affect woodland management.

The moderate shrink-swell potential, the moderate permeability, the depth to bedrock, and the slope are the main limitations affecting most urban and recreational uses.

The capability subclass is IVe. Based on shortleaf pine as the indicator species, the woodland ordination symbol is 8A.

SvE—Stoneville loam, 15 to 25 percent slopes. This well drained soil is on the convex side slopes of prominent hills and on narrow side slopes. Individual areas are generally oblong and range from 7 to about 100 acres in size.

Typically, the surface layer is dark reddish brown loam 5 inches thick. The subsoil is 33 inches thick. The upper part is dark reddish brown loam. The next part is dark reddish brown clay. The lower part is dark reddish brown clay loam. The underlying material is dark reddish brown loam. Soft bedrock is at a depth of 48 inches.

Erosion is a severe hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability and available water capacity are moderate. The shrink-swell potential also is moderate. The depth to soft bedrock ranges from 40 to 60 inches.

Included with this soil in mapping are a few small areas where slopes are slightly more than 25 percent. Also included are some small areas of Mayodan and Ayersville soils. Mayodan soils are in some of the less dissected areas. Ayersville soils are in some of the more dissected areas along steep river bluffs. Included soils make up about 20 percent of the map unit.

Most areas are used as woodland. Some small areas are used as pasture.

This soil generally is not cultivated because of the steep slopes. A few areas are used for pasture. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In forested areas shortleaf pine, Virginia pine, sweetgum, southern red oak, and white oak are the main canopy trees. The understory species are flowering dogwood, cedar, holly, pin oak, sassafras,

redbud, and black cherry. The slope is the main limitation affecting woodland management.

This soil is severely limited as a site for most urban and recreational uses because of the slope. Erosion is a hazard when the ground cover is removed.

The capability subclass is VIe. Based on shortleaf pine as the indicator species, the woodland ordination symbol is 8R.

SwC—Stoneville-Urban land complex, 2 to 10 percent slopes. This map unit occurs as intermingled areas of a well drained Stoneville soil and Urban land. It is about 50 percent Stoneville soil, 35 percent Urban land, and 15 percent included soils. Most areas are irregular in shape and range from 10 to about 100 acres in size.

The Stoneville soil is in the open, relatively undisturbed areas. Typically, the surface layer is dark reddish brown loam 5 inches thick. The subsoil is 33 inches thick. The upper part is dark reddish brown loam. The next part is dark reddish brown clay. The lower part is dark reddish brown clay loam. The underlying material is dark reddish brown loam. Soft bedrock is at a depth of 48 inches.

The Urban land has an impervious surface. It is covered with buildings of all types, streets, parking lots, and roads. The extent of site modification varies greatly. Many areas have undergone little disturbance, while other areas have been extensively cut or filled.

Included in mapping are a few areas of Mayodan and Ayersville soils. Also included are open areas where extensive grading and filling have disturbed all or most of the natural soil layers.

The moderate shrink-swell potential, moderate permeability, and depth to bedrock in the Stoneville soil are the main limitations affecting most urban uses. Surface runoff on the Urban land greatly exceeds that on the Stoneville soil. Recommendations for use and management of this map unit generally require onsite investigation.

This unit has not been assigned a capability subclass or a woodland ordination symbol.

Ud—Udorthents, loamy. This map unit consists of two different kinds of areas where digging, grading, or filling has altered most or all of the natural soil. These are borrow areas and landfill areas.

In the borrow areas the soil material has been removed for use as fill in construction. The cuts are 4 to more than 10 feet deep. The base slope in these cuts is level to gently sloping. Most cuts have two or more short, nearly vertical side slopes. The exposed surface layer consists mainly of dense, weathered rock. These areas commonly range from 3 to 30 acres in size.

Included with the borrow areas in mapping are small, intermittently ponded areas and small areas of fill material that has been pushed aside during excavation.

Some borrow areas have been reclaimed and seeded to grass. A few areas have naturally reseeded to wild grasses, weeds, and Virginia pine. The areas commonly have poor physical properties, which restrict plant growth. Available water capacity, fertility, and organic matter content are low. The root zone generally is shallow. Reseeded areas have potential as wildlife habitat.

In the landfill areas landfill activities have altered the natural soil. These are excavated areas where graded trenches have been backfilled with alternating layers of solid refuse and soil material. A final cover of about 2 feet of soil is on the surface. After the final cover is added, the surface is nearly level or gently sloping. The landfill areas generally have been reseeded. A permanent plant cover is being maintained.

Included with the landfill areas in mapping are some areas of undisturbed soil, commonly near the edge of the delineations. The soil between the trenches is relatively undisturbed, except for the final cover used to smooth the entire area.

The characteristics of the soil material within the map unit vary to such a degree that interpretive statements cannot be made, except when onsite examinations of the individual areas are made.

This map unit has not been assigned a capability subclass or a woodland ordination symbol.

Ur—Urban land. This map unit consists of areas where more than 85 percent of the surface is covered by houses, other buildings, streets, parking lots, railroad yards, or other urban structures. Most of these areas are in or near the business districts of Eden, Madison, Mayodan, and Reidsville. The soils and land surfaces have been cut, filled, and graded and their natural characteristics altered or destroyed. The areas of soils are mostly small lawns or shrub gardens near buildings, sidewalks, and parking lots. Slope is commonly 0 to 6 percent.

Runoff is very rapid. It increases the hazard of flooding in low areas. Reservoir siltation is a hazard if graded areas are not stabilized.

Recommendations for use and management of this map unit require onsite examination.

This unit is not assigned a capability subclass or a woodland ordination symbol.

VaB—Vance sandy loam, 2 to 8 percent slopes. This well drained soil is on narrow ridges in the uplands. Individual areas are generally oblong and range from 7 to about 50 acres in size.

Typically, the surface layer is yellowish brown sandy loam 8 inches thick. The subsoil is 28 inches thick. The upper part is strong brown, mottled clay. The lower part is strong brown, mottled clay loam. The underlying material to a depth of 60 inches is multicolored saprolite. It crushes to sandy clay loam in the upper part and to sandy loam in the lower part.

Erosion is a moderate hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability is slow, and available water capacity is moderate. The shrink-swell potential also is moderate.

Included with this soil in mapping are some small eroded areas where the surface layer is sandy clay loam or clay loam. Also included are some small areas of Appling, Helena, Rion, Sedgefield, and Wilkes soils. Appling soils are in smooth areas. Helena soils are in concave areas at the head of drainageways. Rion and Sedgefield soils are on concave slopes at the head of drainageways in areas underlain by mafic rocks. Wilkes soils are on narrow ridges in areas underlain by mafic rocks. Only one or two of these included soils are in a given mapped area. Included soils make up about 10 to 25 percent of the map unit.

Most areas are used as cropland. Some small areas are used as pasture or woodland.

The most common cultivated crops are tobacco, corn, soybeans, and small grain. Horticultural crops, such as tomatoes, strawberries, sweet corn, green beans, and peas, are grown in some areas. The slope, surface runoff, and erosion are the main limitations in cultivated areas. Conservation tillage and crop residue management aid in controlling runoff and erosion. Sodded drainageways, contour farming, stripcropping, field borders, and crop rotations that include close-growing crops also conserve soil and water. Some areas are used for hay and pasture. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In convex forested areas, Virginia pine, shortleaf pine, southern red oak, black oak, white oak, sweetgum, and hickory are the major canopy trees. Yellow poplar is the major canopy tree in small concave areas at the head of drainageways. The understory species are flowering dogwood, sourwood, holly, black cherry, and sassafras. Few limitations affect woodland management.

This soil has moderate or severe limitations as a site for most urban and recreational uses because of the slow permeability and the moderate shrink-swell potential.

The capability subclass is IIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7A.

VaD—Vance sandy loam, 8 to 15 percent slopes. This well drained soil is on convex side slopes in the uplands. Individual areas are generally oblong and range from 7 to about 50 acres in size.

Typically, the surface layer is yellowish brown sandy loam 8 inches thick. The subsoil is 28 inches thick. The upper part is strong brown, mottled clay. The lower part is strong brown, mottled clay loam. The underlying material to a depth of 60 inches is multicolored saprolite. It crushes to sandy clay loam in the upper part and to sandy loam in the lower part.

Erosion is a severe hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability is slow, and available water capacity is moderate. The shrink-swell potential also is moderate.

Included with this soil in mapping are some small eroded areas where the surface layer is sandy clay loam or clay loam. Also included are some small areas of Cecil, Iredell, Rion, and Wilkes soils. Only one or two of these included soils are in any one mapped area. Cecil soils are on smooth slopes in the larger mapped areas. Iredell soils are in areas underlain by basic rock intrusions. Rion soils are in positions on the landscape similar to those of the Vance soil. Wilkes soils are in the more dissected areas underlain by basic rock intrusions, generally near streams. Included soils make up about 15 to 30 percent of the map unit.

Most areas are used as cropland. Some small areas are used as pasture or woodland.

This soil generally is not cultivated because of the slope. Hay and pasture forage crops are grown in a few areas. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In convex forested areas, Virginia pine, shortleaf pine, southern red oak, black oak, white oak, sweetgum, and hickory are the major canopy trees. Yellow poplar is the major canopy tree in small concave areas at the head of drainageways. The understory species are flowering dogwood, sourwood, holly, black cherry, and sassafras. Few limitations affect woodland management.

This soil has moderate or severe limitations as a site for most urban and recreational uses because of the slow permeability, the slope, and the moderate shrink-swell potential.

The capability subclass is VIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7A.

WaD—Wateree fine sandy loam, 6 to 15 percent slopes. This well drained soil is on narrow ridges and side slopes in the uplands. Individual areas are

generally oblong and range from 7 to about 35 acres in size.

Typically, the surface layer is dark brown fine sandy loam 6 inches thick. The subsoil is 16 inches thick. It is light yellowish brown fine sandy loam in the upper part and brownish yellow sandy loam in the lower part. The underlying material is yellowish brown sandy loam. Soft bedrock is at a depth of 25 inches.

Erosion is a severe hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability is moderately rapid, and available water capacity is low. The depth to soft bedrock ranges from 20 to 40 inches. Typically, the depth to hard bedrock is more than 60 inches.

Included with this soil in mapping are a few areas of soils that have slopes of more than 15 percent, areas where the surface layer is sandy loam, and a few areas where gravel and stones are on the surface. Also included are some small areas of Cecil, Pacolet, Rion, and Wilkes soils. Cecil and Pacolet soils are on the smoother parts of the landscape. Rion soils are in landscape positions similar to those of the Wateree soil. Wilkes soils are in knobby areas where small dikes of basic rocks extend to the surface. Included soils make up about 15 to 30 percent of the map unit.

Most areas are used as woodland. Some small areas are used as cropland or pasture.

The major cultivated crops are tobacco, corn, and soybeans. Because of the slope and the depth to soft bedrock, measures that effectively control runoff and erosion are needed in cultivated areas. The soil is droughty during periods of limited rainfall. Some areas are used for hay and pasture forage crops. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In forested areas post oak, southern red oak, sweetgum, hickory, maple, and chestnut oak are the main canopy trees. The understory species are flowering dogwood, holly, sourwood, black cherry, redbud, and sassafras. A restricted rooting depth and the low available water capacity are the main limitations affecting woodland management.

This soil is severely limited as a site for most sanitary facilities because of the depth to soft bedrock. It is moderately limited as a site for most kinds of building site development and recreational uses because of the slope and the depth to bedrock.

The capability subclass is VIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7A.

WaF—Wateree fine sandy loam, 15 to 45 percent slopes. This well drained soil is on steep, convex side slopes above drainageways. Individual areas are generally oblong and range from 7 to about 60 acres in size.

Typically, the surface layer is dark brown fine sandy loam 6 inches thick. The subsoil is 16 inches thick. It is light yellowish brown fine sandy loam in the upper part and brownish yellow sandy loam in the lower part. The underlying material is yellowish brown sandy loam. Soft bedrock is at a depth of 25 inches.

Erosion is a severe hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability is moderately rapid, and available water capacity is low. The depth to soft bedrock ranges from 20 to 40 inches.

Included with this soil in mapping are a few areas of soils that have a surface layer of sandy loam and a few areas where gravel and stones are on the surface. Also included are some small areas of Pacolet, Rion, and Wilkes soils. Pacolet soils are in the smoother areas near the main part of ridges. Rion soils are in landscape positions similar to those of the Wateree soil. Wilkes soils are in scattered areas where small dikes of basic rocks extend to the surface. Included soils make up about 15 to 25 percent of the map unit.

Most areas are used as woodland. Some small areas are used as pasture.

This soil generally is not used for cultivated crops. Some areas are used for hay and pasture forage crops. Proper pasture management helps to maintain a protective plant cover and helps to control runoff and erosion.

In forested areas shortleaf pine, Virginia pine, white oak, black oak, southern red oak, sweetgum, hickory, maple, and chestnut oak are the main canopy trees. The understory species are flowering dogwood, holly, sourwood, black cherry, redbud, and sassafras. A restricted rooting depth, the low available water capacity, and the slope are the main limitations affecting woodland management.

This soil is severely limited as a site for most urban and recreational uses because of the slope and the depth to bedrock.

The capability subclass is VIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7R.

We—Wehadkee silt loam. This nearly level, poorly drained soil is on narrow flood plains. It is frequently flooded for brief periods in winter and spring. Slopes range from 0 to 2 percent. Individual areas are generally long and narrow and range from 7 to about 50 acres in size.

Typically, the surface layer is light brownish gray silt loam 7 inches thick. The subsoil is 40 inches thick. It is light brownish gray, mottled sandy loam to a depth of

10 inches; light brownish gray, mottled silty clay loam to a depth of 16 inches; grayish brown, mottled silty clay loam to a depth of 23 inches; gray, mottled loam to a depth of 28 inches; and gray, mottled clay loam to a depth of 47 inches. The underlying material to a depth of 60 inches is gray, mottled clay loam.

Permeability is moderate, and available water capacity is high. The seasonal high water table is at or near the surface during wet periods.

Included with this soil in mapping are a few small areas of soils that have a surface layer of loam or fine sandy loam. Also included are a few small areas of Chewacla soils on the higher parts of the flood plains and a few small areas of Chastain soils in landscape positions similar to those of the Wehadkee soil.

Most areas are used as woodland. This soil generally is not used for crops or pasture because of the wetness and the flooding.

In forested areas sweetgum, willow oak, water oak, green ash, and white ash are the dominant canopy trees. The understory species are sourwood, alder, red maple, and winged elm. The wetness and the flooding are the main limitations affecting woodland management.

The wetness and the flooding severely limit this soil as a site for urban and recreational uses.

The capability subclass is IVw in drained areas and VIw in undrained areas. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9W.

WhB—Wickham sandy loam, 1 to 4 percent slopes. This well drained soil is on narrow, slightly elevated stream terraces. Individual areas are generally oblong and irregular in width and are commonly less than 40 acres in size.

Typically, the surface layer is dark brown sandy loam 12 inches thick. The subsoil is 38 inches thick. The upper part is brown sandy clay loam. The next part is yellowish red sandy clay loam. The lower part is strong brown sandy loam. The underlying material to a depth of 60 inches is reddish yellow sand.

Permeability and available water capacity are moderate. The soil can be worked throughout a wide range in moisture content.

Included with this soil in mapping are a few small areas where the surface layer is loamy sand or loam; a few areas where slopes are slightly more than 4 percent; a few areas of Congaree soils on the lower parts of the landscape, near the streams; and a few wet areas near the edge of the unit, adjacent to the uplands. Also included are areas of Pacolet and Cecil soils on small upland mounds that extend onto the terraces. Included soils make up 10 to 25 percent of the map unit.

Most areas are used as cropland. Some small areas are used as pasture or woodland.

The most common cultivated crops are tobacco, corn, soybeans, and small grain. Horticultural crops, such as tomatoes, strawberries, sweet corn, green beans, and peas, also are grown. Conservation tillage and crop residue management aid in controlling runoff and erosion. Diversions, sodded drainageways, field borders, and crop rotations that include close-growing crops also conserve soil and water. Some areas are used for hay and pasture. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In forested areas Virginia pine, shortleaf pine, southern red oak, black oak, white oak, yellow poplar, sweetgum, and hickory are the main canopy trees. The understory species are flowering dogwood, sourwood, holly, black cherry, and sassafras. Few limitations affect woodland management.

The limitations that affect most urban and recreational uses are slight. Seepage is a problem on sites for some sanitary facilities.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9A.

WkC—Wilkes sandy loam, 4 to 10 percent slopes. This well drained soil is on narrow ridges and side slopes in the uplands. Individual areas are generally oblong and range from 7 to about 50 acres in size.

Typically, the surface layer is brown sandy loam 7 inches thick. The subsoil is strong brown sandy clay loam 8 inches thick. Below this is moderately hard bedrock.

Erosion is a moderate hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability is moderately slow, and available water capacity is very low. The depth to soft or moderately hard bedrock is less than 20 inches.

Included with this soil in mapping are a few areas of soils that have slopes of more than 10 percent, a few small areas where the surface layer is loam, and a few small areas that have gravel or cobbles on the surface. Also included are some small areas of Mecklenburg, Sedgefield, and Iredell soils. Mecklenburg soils are in the broader convex areas. Sedgefield and Iredell soils are in concave areas near intermittent drainageways. Included soils make up 10 to 25 percent of the map unit.

Most areas are used as woodland. Some small areas

are used as cropland.This soil generally is not used for row crops. In a few areas that are cultivated, corn and tobacco are the main crops. Where the soil is cultivated, intensive practices that effectively control runoff and erosion are needed. Constructing grassed waterways and diversions is difficult because of the depth to bedrock. Some areas are used for hay and pasture. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In forested areas post oak, southern red oak, sweetgum, hickory, shortleaf pine, Virginia pine, eastern redcedar, and maple are the main canopy trees. The understory species are flowering dogwood, holly, sourwood, black cherry, redbud, and sassafras. A restricted rooting depth is the main limitation affecting woodland management.

The depth to bedrock is a severe limitation affecting most urban and recreational uses.

The capability subclass is IVe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7D.

WkF—Wilkes sandy loam, 10 to 45 percent slopes. This well drained soil is on upland side slopes that are dissected by intermittent drainageways. Individual areas range from 5 to more than 60 acres in size.

Typically, the surface layer is brown sandy loam 7 inches thick. The subsoil is strong brown sandy clay loam 8 inches thick. Below this is moderately hard bedrock.

Erosion is a severe hazard in areas where the surface of this soil is bare and unprotected. In these areas surface runoff is rapid. Permeability is moderately slow, and available water capacity is very low. The depth to soft or moderately hard bedrock is less than 20 inches.

Included with this soil in mapping are a few areas of soils that have a surface layer of loam. Also included are some small areas of Pacolet and Rion soils, which are underlain by acid crystalline rocks; some small areas of Iredell soils on the gentler concave slopes; and some small areas of rock outcrop. Included areas make up 15 to 30 percent of the map unit.

Most areas are used as woodland. This soil generally is not used for row crops. Some areas are used for pasture. Proper pasture management helps to maintain a protective plant cover and thus helps to control runoff and erosion.

In forested areas shortleaf pine, Virginia pine, post oak, southern red oak, sweetgum, hickory, maple, and eastern redcedar are the main canopy trees. The understory species are flowering dogwood, holly, sourwood, black cherry, redbud, and sassafras. A restricted rooting depth and the slope are the main limitations affecting woodland management.

This soil is severely limited as a site for most urban and recreational uses because of the slope and the depth to bedrock.

The capability subclass is VIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7R.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, state, and federal levels, as well as individuals, must encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to food, feed, forage, fiber, and oilseed crops. Such soils have properties that favor the economic production of sustained high yields of crops. The soils need only to be treated and managed by acceptable farming methods. The moisture supply must be adequate, and the growing season must be sufficiently long. Prime farmland soils produce the highest yields with minimal expenditures of energy and economic resources. Farming these soils results in the least damage to the environment.

Prime farmland soils may presently be used as cropland, pasture, or woodland or for other purposes. They are used for food or fiber or are available for these uses. Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water-control structures. Public land is land not available for farming in national forests, national parks, military reservations, and state parks.

Prime farmland soils usually receive an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity or alkalinity level of the soils is acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not frequently flooded during the growing season.

The slope ranges mainly from 0 to 8 percent.

The following map units are considered prime farmland in Rockingham County. The location of each map unit is shown on the detailed soil maps at the back of this publication. The extent of each unit is given in table 4. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use.

Some soils that have a high water table qualify as prime farmland only in areas where this limitation has been overcome by drainage measures. If applicable, the need for these measures is indicated in parentheses after the map unit name in the following list. Onsite evaluation is necessary to determine if the limitation has been overcome by corrective measures.

The soils identified as prime farmland in Rockingham County are:

ApB	Appling sandy loam, 2 to 8 percent slopes
CcB	Cecil sandy loam, 2 to 8 percent slopes
CdB2	Cecil sandy clay loam, 2 to 8 percent slopes, eroded
CrB	Creedmoor fine sandy loam, 1 to 4 percent slopes
DoB	Dogue loam, 0 to 4 percent slopes
HeB	Helena sandy loam, 2 to 8 percent slopes
HwB	Hiwassee loam, 2 to 8 percent slopes
MbB2	Madison sandy clay loam, 2 to 8 percent slopes, eroded
MdB	Mayodan sandy loam, 2 to 8 percent slopes
MeB2	Mayodan sandy clay loam, 2 to 8 percent slopes, eroded
MkB2	Mecklenburg sandy clay loam, 2 to 8 percent slopes, eroded
SeB	Sedgefield sandy loam, 2 to 8 percent slopes (where drained)
SvB	Stoneville loam, 2 to 8 percent slopes
VaB	Vance sandy loam, 2 to 8 percent slopes
WhB	Wickham sandy loam, 1 to 4 percent slopes

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern that is in harmony with nature.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock or wetness can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

David R. Hopkins, district conservationist, and Foy D. Hendrix, conservation agronomist, both of the Soil Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the North Carolina Agricultural Extension Service.

The acreage of cropland in Rockingham County slightly decreased during the period 1972 to 1982. During the same period, the extent of land conversion, mostly of woodland to residential and industrial development, increased. About 3,250 acres was converted during those 10 years.

According to the Census of Agriculture, Rockingham County had approximately 63,694 acres of cropland and 12,656 acres of pasture and hayland in 1978. In 1981, tobacco was grown on an estimated 10,000 acres; corn on 8,700 acres; soybeans on 8,000 acres; small grain, including wheat, oats, and barley, on 8,500 acres; and small fruits and vegetables on 1,000 acres. Most pasture and hayland supports tall fescue grass. Alfalfa, orchardgrass, and red clover are grown on small acreages.

If economical, other suitable crops are sunflowers, sweet potatoes, and various truck crops. Deep, well drained soils, such as Cecil, Appling, and Vance soils, are well suited to the production of truck crops. Some truck crops and small fruits, such as strawberries, are grown in the county. The numerous irrigation systems and farm ponds in the county can be used in producing high-value truck crops. Most of the well drained soils in the county are well suited to orchards and nursery plants.

Water erosion is a major management concern on about two-thirds of the cropland and pasture in the county. It is a hazard on all upland soils that have a slope of more than 4 percent. It is particularly a hazard on soils that formed in material weathered from Triassic sedimentary rocks. These include Mayodan, Stoneville,

Pinkston, Creedmoor, Ayersville, Leaksville, and Spray soils.

Loss of the topsoil layer through erosion is damaging for two reasons. First, tilth deteriorates and productivity is reduced as this layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the topsoil layer is especially damaging on soils that have a relatively high content of clay in the subsoil, such as Helena, Mecklenburg, and Iredell soils. Deep plowing with bigger tractors and plows has tended to complete this mixing of subsoil and topsoil material. Second, erosion results in the sedimentation of streams and reservoirs. Controlling erosion minimizes this pollution and improves the quality of water for municipal use, recreation, and fish and wildlife.

Resource management systems provide a protective cover, reduce the runoff rate, and increase the rate of water infiltration. Improved cropping systems, conservation tillage, management of crop residue, terraces, stripcropping, grassed waterways, and field borders help to control erosion on cropland.

Information about the design and application of erosion-control measures can be obtained from the local office of the Soil Conservation Service.

Soil tilth is an important factor affecting the germination of seeds and the infiltration of water into the soil. Soils with good tilth are granular and porous.

On many soils used as cropland, the surface layer is sandy loam or loam and generally is low in organic matter content. On most of these soils, a crust forms on the surface after periods of intense rainfall. When a crust forms, the soil is almost impervious to water. The crust reduces the rate of water infiltration and increases the runoff rate. Regular additions of crop residue, manure, and other organic material improve soil structure and minimize crusting.

Soils that have a surface layer of sandy clay loam, such as the eroded Cecil, Pacolet, and Mayodan soils, are even more susceptible to crust formation. Also, they tend to form clods if cultivated when too moist.

Wetness is a problem on the somewhat poorly drained and poorly drained soils, such as Chastain, Chewacla, Leaksville, and Wehadkee soils.

Soil Fertility

The soils in Rockingham County generally are low in natural fertility. They are naturally acid. Additions of lime and fertilizer are needed for the production of most crops. The soils that formed from mafic rock types, such as Iredell, Mecklenburg, Sedgefield, and Wilkes soils, are generally less acid than other soils in the county.

Liming requirements are a major concern on cropland. The acidity level in the soil affects the availability of many nutrients to plants and the activity of beneficial bacteria. Lime also neutralizes exchangeable aluminum in the soil and thus counteracts the adverse effects of high levels of aluminum on many crops. Liming adds calcium (from calcitic lime) or calcium and magnesium (from dolomitic lime) to the soil.

A soil test is a guide to what amount and kind of lime should be used. The desired pH levels may differ, depending on the soil properties and the crop to be grown.

Nitrogen fertilizer is required for most crops. It is generally not required, however, for clover, in some rotations of soybeans, or for alfalfa that is established. A reliable soil test is not available for predicting nitrogen requirements. Appropriate rates of nitrogen application are described in the section "Yields Per Acre."

Soil tests can indicate the need for phosphorus and potassium fertilizers. These soil tests are needed because applied phosphorus and potassium tend to build up in the soil.

Chemical Weed Control

The use of herbicides for weed control on cropland is a common practice in Rockingham County. An integral part of modern farming, it decreases the need for tillage. Soil properties, such as organic matter content and texture of the surface layer, affect the rate of herbicide application. These properties were estimated for the soils in this county. Table 15 shows a general range of organic matter content in the surface layer of the soils. The texture of the surface layer is given in the detailed map units and in the USDA texture column in table 14.

In some areas the organic matter content of a soil may be outside the range shown in table 15. The content may be higher in soils that have received high amounts of animal or manmade waste. Soils that have recently been brought into cultivation may have a higher organic matter content in the surface layer than similar soils that have been cultivated for a long period. Conservation tillage increases the content of organic matter in the surface layer. Lower levels of organic matter are common where erosion, land smoothing, or other human activities have partly or completely removed the surface layer. Current soil tests are needed to measure the organic matter content before the required herbicide rates are determined. The labels of herbicides show specific application rates based on organic matter content and texture of the surface layer.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management

are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

A high level of management includes maintaining proper soil reaction and fertility levels as indicated by standard soil tests. The application rate of nitrogen for corn on soils that have a yield potential of 125 to 150 bushels per acre should be 140 to 160 pounds per acre. If the yield potential for corn is 100 bushels per acre or less, a rate of 100 to 120 pounds of nitrogen per acre should be used. The application of nitrogen in excess of that required for potential yields generally is not recommended. The excess nitrogen fertilizer that is not utilized by a crop is an unnecessary expense and causes a hazard of water pollution. If corn or cotton is grown after the harvest of soybeans or peanuts, nitrogen rates can be reduced by about 20 to 30 pounds per acre.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the North Carolina Agricultural Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for use as cropland. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major, and generally expensive, landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use. They are not recognized in Rockingham County.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode, but they have other limitations, impractical to remove, that limit their use. Class V soils are not recognized in Rockingham County.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production. Class VIII soils are not recognized in Rockingham County.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless a close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils

the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry. Subclasses *s* and *c* are not recognized in Rockingham County.

There are no subclasses in class I because the soils of this class have few limitations. The soils in class V are subject to little or no erosion, but they have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation. Class V contains only the subclasses indicated by *w, s,* or *c*.

The acreage of soils in each capability class and subclass is shown in table 6. The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in table 5.

Woodland Management and Productivity

Edwin J. Young, forester, Soil Conservation Service, helped prepare this section.

Forest managers in Rockingham County are faced with the challenge of producing greater yields from smaller areas of forest land. Meeting this challenge requires intensive management and silvicultural practices. Many silvicultural techniques resemble those long practiced in agriculture. These techniques include establishing, weeding, and thinning a desirable young stand; propagating the more productive species and genetic varieties; managing short rotations and complete fiber utilization; controlling insects, diseases, and weeds; and improving tree growth by applications of fertilizer. Timber crops require decades to grow. Even so, the goal of intensive management on forest land is similar to that on cropland—to produce the greatest yield of the most valuable crop as quickly as possible.

Commercial forests make up 193,770 acres in Rockingham County, or about 53 percent of the land area *(10)*. Commercial forest is land that is producing or capable of producing crops of industrial wood and is not withdrawn from timber production. Loblolly pine can be an important timber species in the county because it grows fast, is adapted to the soil and climate, brings the highest average sale value per acre, and is easy to establish and manage.

One of the first steps in intensively managing forest land is to determine the productive capacity of the land for several alternative tree species. Comparisons are then made of potential yield and value so that the most productive and valued trees can be selected for each parcel of land. Site and yield information enables a forest manager to estimate future wood supplies. These estimates can be used to make realistic decisions about future expenses and profits associated with intensive forest management, land acquisition, or industrial investments.

The productive capacity of forest land depends on physiography, soil properties, climate, and the effects of past management. Specific soil properties and site characteristics affect forest productivity primarily by influencing available water capacity, aeration, and root development. These properties and characteristics include soil depth, texture, structure, and depth to the water table. The net effects of the interaction of these factors determine site productivity.

Other site factors also can be important. The gradient and length of slopes affect water movement and availability. Elevation and aspect affect solar radiation and rates of evaporation. A south aspect is warmer and drier than a north aspect. The best tree growth is generally on north and east aspects on the lower slopes, in sheltered coves, and on gentle, concave slopes. The amount of rainfall and length of growing season influence site productivity.

This soil survey can be used by woodland managers planning ways to increase the productivity of forest land. Some soils respond better to applications of fertilizer than others, and some are more susceptible to landslides and erosion after roads are built and timber is harvested. Some soils require special reforestation efforts. For each map unit in the survey area suitable for producing timber, the section "Detailed Soil Map Units" presents information about productivity, limitations in harvesting timber, and management concerns in producing timber. The common forest understory plants are also listed. Table 7 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight, moderate*, and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

The first tree listed for each soil in the column *Common trees* is the indicator species for that soil. An indicator species is a tree that is common in the area and that is generally the most productive on a given soil.

Table 7 lists the *ordination symbol* for each soil. The first part of the ordination symbol, a number, indicates the potential productivity of a soil for the indicator species in cubic meters per hectare. The larger the number, the greater the potential productivity. Potential productivity is based on the site index and the point where mean annual increment is the greatest.

The second part of the ordination symbol, a letter, indicates the major kind of soil limitation affecting use and management. The letter *R* indicates a soil that has

a significant limitation because of steepness of slope. The letter *W* indicates a soil in which excessive water, either seasonal or year-round, causes a significant limitation. The letter *D* indicates a soil that has a limitation because of restricted rooting depth, such as a shallow soil that is underlain by hard bedrock, a hardpan, or other layers that restrict roots. The letter *C* indicates a soil that has a limitation because of the kind or amount of clay in the upper part of the profile. The letter *A* indicates a soil that has no significant restrictions or limitations affecting forest use and management. If a soil has more than one limitation, the priority is as follows: R, W, D, and C.

Ratings of the *erosion hazard* indicate the probability that damage may occur if site preparation or harvesting activities expose the soil. The risk is *slight* if no particular preventive measures are needed under ordinary conditions; *moderate* if erosion-control measures are needed for particular silvicultural activities; and *severe* if special precautions are needed to control erosion for most silvicultural activities. Ratings of moderate or *severe* indicate the need for construction of higher standard roads, additional maintenance of roads, additional care in planning harvesting and reforestation activities, or the use of special equipment.

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, stoniness, or susceptibility of the surface layer to compaction. As slope gradient and length increase, it becomes more difficult to use wheeled equipment. On the steeper slopes, tracked equipment must be used. The rating is *slight* if the equipment use is restricted by soil wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if slopes are so steep that wheeled equipment cannot be operated safely across the slope, if wetness restricts equipment use from 2 to 6 months per year, if stoniness restricts ground-based equipment, or if special equipment is needed to prevent or minimize soil compaction. The rating is *severe* if slopes are so steep that tracked equipment cannot be operated safely across the slope, if wetness restricts equipment use for more than 6 months per year, if stoniness restricts ground-based equipment, or if special equipment is needed to prevent or minimize soil compaction. Ratings of *moderate* or *severe* indicate a need to choose the most suitable equipment and to carefully plan the timing of harvesting and other management activities.

Ratings of *seedling mortality* refer to the probability of the death of naturally occurring or properly planted seedlings of good stock in periods of normal rainfall, as influenced by kinds of soil or topographic features. Seedling mortality is caused primarily by too much water or too little water. The factors used in rating a soil for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, rooting depth, and the aspect of the slope. The mortality rate generally is highest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of *moderate* or *severe* indicate that it may be necessary to use containerized or larger than usual planting stock or to make special site preparations.

The *potential productivity* of *common trees* on a soil is expressed as a *site index*. Common trees are listed in the order of their observed general occurrence. Additional species that commonly occur on the soil may be listed in the detailed soil map unit descriptions. Generally, only two or three tree species dominate.

For the soils that are commonly used for timber production, the yield is predicted in cubic feet per acre per year. It is predicted at the point where mean annual increment culminates. The productivity of the soils in this survey is based mainly on loblolly pine *(5)*. Indexes are shown also for shortleaf pine *(5)*, sweetgum *(3)*, and Virginia pine *(4)*.

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. The site index for this survey is the average height, in feet, that the trees attain in 50 years. This index applies to fully stocked, even-aged, unmanaged stands.

Trees to plant are those that are used for reforestation or, under suitable conditions, natural regeneration. They are suited to the soils and can produce a commercial wood crop. The desired product, topographic position (such as a low, wet area), and personal preference are three factors among many that can influence the choice of trees for use in reforestation.

Recreation

Dick Y. Fowler, resource conservation and development project coordinator, Soil Conservation Service, helped prepare this section.

Rockingham County, which is situated on the edge of the Piedmont Crescent, is experiencing rapid population growth and industrialization. Because of quality water in ample supply, availability of suitable labor, close proximity to major transportation corridors, and relatively inexpensive land suitable for development, increased pressures of development are likely. Increased growth will create added pressures on

currently existing recreation facilities and a need for expanded recreation opportunities.

A variety of municipally supported recreation activities are available in the county. Reidsville has developed parks at Lake Hunt and Lake Reidsville that include open play areas and offer opportunities for swimming, picnicking, hiking, camping, boating, and fishing on a fee basis.

Farris Park, a 279-acre area near Mayodan, provides opportunities for recreation activities, including miniature golf, open field sports, fishing, hiking, and picnicking. White water canoeing is available on the Mayo River. Belews Lake, a 4,300-acre reservoir owned by Duke Power, offers opportunities for boating and picnicking. Public access is available.

Hunting and fishing are the most extensive outdoor recreation activities in Rockingham County. Most of the streams and municipal lakes in the county support good populations of sport fish. The Mayo River also supports smallmouth bass. Excellent sport fishing is available on the county's 2,500 farm ponds. White-tailed deer are hunted in the county. Deer populations are highest in areas along the Dan and Haw Rivers and their tributaries. These areas have a good food supply and plant cover. Wild turkey has recently been introduced, but huntable populations are not available. Opportunities for waterfowl hunting are available in the county. The poorly drained flood plains along the Haw River, Troublesome Creek, Hogans Creek, and Benaja Creek have the largest populations of waterfowl. Quail, rabbits, squirrels, and doves are hunted throughout the county.

The county has high potential for the development of additional recreation facilities and for the expansion of facilities currently available. Because of the contrasting topography and soils in the county, careful planning is needed to ensure the proper location and design of any additional facilities. Knowledge of soils and soil properties is needed to guide and formulate the planning.

In table 8, the soils of the survey area are rated according to the limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 8, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes, stones, or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm

when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

John P. Edwards, biologist, Soil Conservation Service, helped prepare this section.

Rockingham County has a diverse wildlife habitat and is particularly suited to small game, such as quail, rabbit, dove, and squirrel. Throughout the county, the soils are generally well suited to the establishment and growth of most species of native and introduced food and cover plants for wildlife.

Huntable populations of deer, the only big game species in the county, are throughout the county. The largest concentration of deer is along the Dan and Haw Rivers. The Cecil and Appling soils in these areas are well suited to row crops. Corn and soybeans are a food supply for deer. The densely wooded Wehadkee, Chastain, and Chewacla soils on flood plains provide good cover for deer. Given adequate levels of management and protection, the potential for deer habitat is high in the entire county.

Waterfowl populations are generally good in the county. They are highest on the many creeks and rivers in the county. Areas of Chastain and Wehadkee soils, especially those along the Haw River, Troublesome Creek, Hogans Creek, and Benaja Creek, provide the best habitat for waterfowl. In addition to this stream habitat, Belews Lake, Lake Hunt, Lake Reidsville, and about 2,500 farm ponds provide habitat for waterfowl. The potential for wood ducks is high in these areas if the food supply and the plant cover are maintained. Migratory species, such as mallards and black ducks, commonly frequent these areas in winter.

Wild turkeys have been introduced in the northwestern part of the county. Extensive hardwood forests in areas of the steep Madison and Pacolet soils in this part of the county provide the best habitat for wild turkey. Huntable populations of this species have not yet been established.

Beaver is the most populous furbearer in the county. The poorly drained Wehadkee and Chastain soils on flood plains along the smaller streams provide excellent habitat for beaver. The beaver population is especially high in areas along the Haw River, Benaja Creek, Troublesome Creek, and Hogans Creek.

The patterns of agriculture in the county favor the resident wildlife species. Even on relatively small farms, mixed crop fields and woodland provide abundant edge habitat. This habitat is very important to all wildlife species in the county.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and soybeans.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture

are also considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are lespedeza, wild bean, beggarweed, pokeweed, and partridge pea.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, gallberry, American holly, dogwood, hickory, waxmyrtle, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian olive, autumn olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Wetland plants are annual and perennial, wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, slope, and surface stoniness. Examples of wetland plants are smartweed, ferns, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are waterfowl feeding areas and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, dove, meadowlark, field sparrow, cottontail rabbit, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, red-winged blackbirds, and beaver.

Engineering

John F. Rice, assistant state conservation engineer, and Ronald Marlow, area engineer, both of the Soil Conservation Service, helped prepare this section.

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity,

shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, stone content, soil texture, and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. Depth to a high water table, depth to bedrock, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock, depth to a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, depth to a high water table, depth to bedrock, and the available water capacity in the upper 40 inches affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established. Soil tests are essential to determine liming and fertilizer needs. Help in making soil tests or in deciding what soil additive, if any, should be used can be obtained from the Rockingham County Soil and Water Conservation District or the local office of the North Carolina Agricultural Extension Service.

Sanitary Facilities

Table 11 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if

soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and that good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, depth to a high water table, depth to bedrock, and flooding affect absorption of the effluent. Large stones and bedrock interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Animal waste lagoons commonly used in farming operations are generally deeper and rely on anaerobic bacteria to decompose waste material. These types of lagoons are not considered in the ratings.

Table 11 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, depth to a high water table, depth to bedrock, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope and bedrock can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock, depth to a water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, and soil reaction affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock or the water table to permit revegetation. The soil material used as final cover for a

landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, depth to the water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and depth to the water table is less than 1 foot. These soils may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, depth to the water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, depth to the water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are naturally fertile or respond well to fertilizer and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel or stones, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel or stones, have slopes of more than

15 percent, or have a high seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and releases a variety of available plant nutrients as it decomposes.

Water Management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives the restrictive features that affect each soil for drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, mica, or salts or sodium. Depth to the high water table affects the amount of usable material. It also affects trafficability.

Soils that have a high content of mica, such as Madison soils, are poorly suited to use in embankments. The problems resulting from the high content of mica are difficulty in compaction, poor trafficability, an erosion hazard, and low shear strength. Piping commonly is a problem when these soil materials are used to impound water.

Soils that have a high content of sodium in the underlying geologic material also are poorly suited to use in embankments because they may have high rates of dispersion. Stoneville, Mayodan, Pinkston, and Creedmoor are examples of soils that may have a high content of sodium.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock or to other layers that affect the rate of water movement, permeability, depth to a high water table, slope, and susceptibility to flooding. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock, large stones, slope, and the hazard of cutbanks caving. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock. The performance of a system is affected by the depth of the root zone and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 17.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC and silty and clayey soils as ML, CL, OL, MH, CH, and OH. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20, or higher, for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 17.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The

sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

Physical and Chemical Properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate, or component, consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓ bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of movement of water through the soil when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage in each major soil layer is stated in inches of water per inch of soil. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for Mayodan soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion. Losses are expressed in tons per acre per year. These estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values

of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur over a sustained period without affecting crop productivity. The rate is expressed in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 15, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Iredell soils are assigned to a dual hydrologic group (C/D) in table 16. The first letter is for drained areas, and the second letter is for undrained areas.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflowing streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as none, rare, occasional, or frequent. *None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. November-June, for example, means that flooding can occur during the period November through June. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely, thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons characteristic of soils that are not subject to flooding.

Also considered is local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table—that is, *perched* or *apparent;* and the months of the year that the water table commonly is highest. A water table that

is seasonally high for less than 1 month is not indicated in table 16.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

The two numbers in the column showing the depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severely corrosive environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and the amount of sulfates in the saturation extract.

Engineering Index Test Data

Table 17 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are typical of the series and are described in the section "Soil Series and Their Morphology." The soil samples were tested by the North Carolina Department of Transportation and Highway Safety, Materials Test Unit.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 423 (ASTM); Plasticity index—T 90 (AASHTO), D 424 (ASTM); and Moisture density, Method A—T 99 (AASHTO), D 698 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(9)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 18 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Fluvaquents (*Fluv*, meaning river or flooding, plus *aquent*, the suborder of the Entisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Fluvaquents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, nonacid, thermic Typic Fluvaquents.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. There can be some variation in the texture of the surface layer or of the substratum within a series. The Wehadkee series is an example of fine-loamy, mixed, nonacid, thermic Typic Fluvaquents.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual (8)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (9)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Appling Series

The Appling series consists of deep, well drained, moderately permeable soils that formed in material weathered from granite or gneiss. These soils are on broad ridges and narrow side slopes above

drainageways. Slopes range from 2 to 15 percent.

Typical pedon of Appling sandy loam, 2 to 8 percent slopes; 3 miles southwest of Monroeton on U.S. Highway 158, about 1,350 feet north of Midway on Secondary Road 1001, and 300 feet west of Secondary Road 1001, in a tobacco field:

Ap—0 to 9 inches; yellowish brown (10YR 5/4) sandy loam; weak fine granular structure; very friable; common fine and medium roots; few pebbles of quartzite; slightly acid; clear smooth boundary.

Bt1—9 to 12 inches; reddish yellow (7.5YR 6/8) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky; common fine roots; common fine and medium pores; few pebbles of quartzite; strongly acid; clear smooth boundary.

Bt2—12 to 19 inches; reddish yellow (7.5YR 6/8) clay loam; common medium distinct red (2.5YR 5/8) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; thin distinct clay films on faces of peds; few fine roots; common fine and medium pores; few fine flakes of mica; strongly acid; gradual smooth boundary.

Bt3—19 to 35 inches; strong brown (7.5YR 5/8) clay; common medium distinct red (2.5YR 5/8) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; thick distinct clay films on faces of peds; few fine roots; common fine and medium pores; common fine flakes of mica; strongly acid; gradual wavy boundary.

BC1—35 to 42 inches; strong brown (7.5YR 5/6) clay loam; common medium distinct yellowish red (5YR 5/6) and few fine distinct yellow (10YR 8/6) mottles; weak medium subangular blocky structure; firm, sticky and slightly plastic; few thin distinct clay films on faces of peds; few fine pores; common fine flakes of mica; about 15 percent saprolite; very strongly acid; gradual wavy boundary.

BC2—42 to 46 inches; reddish yellow (5YR 6/8) clay loam; common medium distinct red (2.5YR 5/8) and yellow (10YR 8/6) mottles; weak medium subangular blocky structure; friable, slightly sticky; common fine flakes of mica; about 25 percent saprolite; very strongly acid; gradual wavy boundary.

C—46 to 65 inches; reddish yellow (7.5YR 7/6), red (2.5YR 5/8), and yellow (10YR 8/6) saprolite that is sandy clay loam; massive; friable; common fine flakes of mica; few bodies of clay loam; very strongly acid.

The thickness of the B horizon ranges from 29 to 51 inches. The soils are strongly acid or very strongly acid unless limed.

The A or Ap horizon has hue of 10YR to 2.5Y, value of 3 to 6, and chroma of 2 to 6. The E horizon, if it occurs, has hue of 7.5YR to 10YR, value of 5 or 6, and chroma of 3 to 8. It is sandy loam or fine sandy loam.

The BE horizon, if it occurs, has hue of 5YR to 10YR, value of 5 or 6, and chroma of 3 to 8. It is sandy clay loam or clay loam.

The Bt horizon has hue of 5YR to 10YR, value of 5 or 6, and chroma of 6 to 8. It is clay, sandy clay, or clay loam that has thin layers of sandy clay loam. The lower part of this horizon has few to many mottles in shades of red, yellow, or brown.

The BC horizon, if it occurs, is similar in color to the Bt horizon. It is sandy clay loam, loam, or clay loam.

The C horizon has hue of 2.5YR to 2.5Y, value of 4 to 8, and chroma of 1 to 8. It is saprolite of acid crystalline rock that crushes to sandy clay loam, loam, or sandy loam.

Ayersville Series

The Ayersville series consists of moderately deep, well drained to excessively drained, moderately permeable soils on uplands. These soils formed in material weathered from Triassic siltstone, mudstone, sandstone, conglomerate, and shale. Slopes range from 4 to 45 percent.

Typical pedon of Ayersville gravelly loam, 4 to 15 percent slopes; north of Eden on Secondary Road 1715; about 1,450 feet east of the intersection of Secondary Road 1797 and Secondary Road 1715 and 30 feet south of Secondary Road 1715, in a forest of Virginia pine:

Ap—0 to 8 inches; dark reddish brown (5YR 3/2) gravelly loam; weak fine granular structure; very friable; common fine, medium, and coarse roots; about 20 percent, by volume, siltstone and mudstone fragments as much as 3 inches in size; very strongly acid; clear smooth boundary.

Bw—8 to 22 inches; dark reddish brown (2.5YR 3/4) gravelly loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; few fine manganese concretions; about 30 percent, by volume, soft mudstone and siltstone fragments as much as 3 inches in size; strongly acid; gradual wavy boundary.

C—22 to 26 inches; reddish brown (2.5YR 4/4) very gravelly silt loam; massive; friable; few fine roots; about 60 percent, by volume, partially weathered soft siltstone and mudstone fragments as much as 3 inches in size; strongly acid; clear irregular boundary.

Cr—26 to 30 inches; reddish brown (2.5YR 4/4),

moderately hard siltstone and mudstone fragments as much as 3 inches in size; few roots in cracks; difficult to cut with a spade.

R—30 inches; reddish brown (2.5YR 4/4), hard siltstone and mudstone.

The loamy horizons are 20 to 40 inches deep over partially weathered siltstone, mudstone, and shale. Reaction is very strongly acid or strongly acid in all horizons. The content of coarse fragments of siltstone, mudstone, and shale ranges from 2 to 35 percent in the A horizon, from 10 to 35 percent in the B horizon, and from 35 to 85 percent in the C horizon.

The A or Ap horizon has hue of 5YR to 10R, value of 3 or less, and chroma of 2 to 6. It is dominantly gravelly loam, but the range includes loam. It also includes silt loam, silty clay loam, and the gravelly analogs of those textures.

The B horizon has hue of 5YR to 10R, value of 3 or less, and chroma of 2 to 6. Mottles with value of more than 3 are in some pedons. This horizon is silt loam, clay loam, silty clay loam, or the gravelly analogs of those textures.

The C horizon is reddish brown or dark reddish brown. It is gravelly, very gravelly, or extremely gravelly silt loam or loam.

The Cr horizon, if it occurs, is reddish brown, dark reddish brown, or dark gray, partially weathered, moderately hard siltstone, mudstone, and shale. The R horizon is reddish brown or dark gray, hard siltstone, mudstone, or shale.

Cecil Series

The Cecil series consists of deep, well drained, moderately permeable soils that formed in material weathered from mica gneiss, mica schist, and gneiss. These soils are on broad ridges. Slopes range from 2 to 10 percent.

Typical pedon of Cecil sandy clay loam, 2 to 8 percent slopes, eroded; 2.5 miles northeast of Bethany, at the intersection of Secondary Road 2406 and Secondary Road 2382; about 400 feet north of intersection on Secondary Road 2382 and 400 feet west of Secondary Road 2382, in a corn field:

Ap—0 to 6 inches; yellowish red (5YR 4/8) sandy clay loam; moderate medium granular structure; friable, slightly sticky and slightly plastic; common fine and medium roots; few small quartz fragments; slightly acid; clear smooth boundary.

Bt1—6 to 22 inches; red (2.5YR 4/8) clay; moderate medium subangular blocky structure; firm, sticky and plastic; few fine and medium roots; thin discontinuous clay films on faces of peds; few small quartz fragments; strongly acid; gradual smooth boundary.

Bt2—22 to 37 inches; red (2.5YR 4/8) clay; moderate medium subangular blocky structure; friable, sticky and plastic; few fine roots; thin discontinuous clay films on faces of peds; few fine flakes of mica; strongly acid; gradual smooth boundary.

Bt3—37 to 52 inches; red (2.5YR 4/8) clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; thin discontinuous clay films on faces of peds; common fine flakes of mica; strongly acid; gradual smooth boundary.

C—52 to 80 inches; mottled red (2.5YR 4/8) and yellowish red (5YR 5/8) saprolite that crushes to clay loam; massive; friable; very strongly acid.

The thickness of the B horizon ranges from 28 to 54 inches. The soils are strongly acid or very strongly acid unless limed.

The A or Ap horizon has hue of 2.5YR to 10YR, value of 4 or 5, and chroma of 3 to 8. It is sandy loam or sandy clay loam.

The E horizon, if it occurs, has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. It is sandy loam, fine sandy loam, or loam.

The Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 to 8. It is dominantly clay or clay loam, but some pedons have thin layers of sandy clay loam.

The C horizon is multicolored saprolite that crushes to loam, sandy loam, sandy clay loam, or clay loam.

Chastain Series

The Chastain series consists of deep, poorly drained, slowly permeable soils that formed in alluvium. These soils are in depressions on flood plains. Slopes range from 0 to 2 percent.

Typical pedon of Chastain silty clay loam; about 6.2 miles southeast of Reidsville on U.S. Highway 29 Business, 75 feet north of the highway, on a wooded flood plain along Troublesome Creek:

A—0 to 6 inches; brown (10YR 5/3) silty clay loam; common medium faint grayish brown (10YR 5/2) and few fine distinct yellowish brown (10YR 5/8) mottles; weak fine granular structure; friable; common fine and medium roots; very strongly acid; clear smooth boundary.

Bg1—6 to 15 inches; light brownish gray (10YR 6/2) silty clay; common medium distinct yellowish red (5YR 4/6) and strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; firm,

slightly sticky and slightly plastic; common medium and few fine roots; medium acid; clear smooth boundary.

Bg2—15 to 25 inches; gray (10YR 6/1) clay; common medium distinct yellowish brown (10YR 5/8) and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; very firm, sticky and plastic; few fine roots; few fine manganese concretions; slightly acid; clear wavy boundary.

Bg3—25 to 40 inches; gray (N 6/0) clay; common medium distinct yellowish brown (10YR 5/8) and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; very firm, sticky and plastic; few fine roots; common fine and medium manganese concretions; slightly acid; clear wavy boundary.

Bg4—40 to 50 inches; gray (N 5/0) clay; common medium distinct yellowish brown (10YR 5/8) and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; very firm, very sticky and plastic; few fine roots; slightly acid; common fine and medium manganese concretions; very firm, sticky and plastic; few fine roots; slightly acid; clear wavy boundary.

BCg—50 to 64 inches; gray (N 6/0) clay loam; many medium distinct strong brown (7.5YR 5/8) and yellowish brown (10YR 5/8) and few fine distinct light olive brown (2.5Y 5/4) mottles; weak medium subangular blocky structure; firm, sticky and plastic; common fine and medium manganese concretions; slightly acid.

The thickness of the B horizon ranges from 33 to 68 inches. The soils are very strongly acid to neutral in the surface layer and strongly acid to neutral below.

The A or Ap horizon has hue of 2.5Y or 10YR, value of 5 to 7, and chroma of 1 to 3. The Bg horizon has hue of 2.5Y or 10YR, value of 5 to 7, and chroma of 1 or 2, or it is neutral in hue and has value of 5 to 7. It is silty clay loam, silty clay, clay, or clay loam. The Cg horizon, if it occurs, has colors similar to those of the Bg horizon, but the textures include sandy loam, sandy clay, clay loam, and stratified sand and gravel.

These soils are considered taxadjuncts to the Chastain series because reaction is higher than is defined as the range for the series.

Chewacla Series

The Chewacla series consists of deep, somewhat poorly drained, moderately permeable soils that formed in alluvium. These soils are on narrow flood plains along the smaller streams and in slightly depressional areas on flood plains along the major streams. Slopes range from 0 to 2 percent.

Typical pedon of Chewacla loam; north of Reidsville along Wolf Island Creek and U.S. Highway 14; about 425 feet northeast of the northeast corner of the Reidsville fairgrounds and 700 feet north of the intersection of North Carolina Highway 14 and Wolf Island Creek, in a fescue pasture:

Ap—0 to 6 inches; dark brown (7.5YR 4/4) loam; weak fine granular structure; very friable; common fine roots; few fine flakes of mica; slightly acid; clear smooth boundary.

Bw1—6 to 9 inches; dark brown (7.5YR 4/4) loam; common fine distinct pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine flakes of mica; slightly acid; clear smooth boundary.

Bw2—9 to 18 inches; strong brown (7.5YR 4/6) sandy clay loam; few fine distinct grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine dark concretions; few fine flakes of mica; medium acid; gradual wavy boundary.

Bw3—18 to 30 inches; strong brown (7.5YR 5/6) loam; common medium distinct light brownish gray (10YR 6/2) and common medium faint strong brown (7.5YR 4/6) mottles; weak medium subangular blocky structure; friable; few fine dark concretions; few fine flakes of mica; medium acid; gradual wavy boundary.

Bw4—30 to 44 inches; yellowish brown (10YR 5/8) loam; common medium distinct dark brown (7.5YR 4/4) and light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; few fine dark concretions; few fine flakes of mica; medium acid; gradual wavy boundary.

Bw5—44 to 60 inches; dark brown (7.5YR 4/4) loam; common medium distinct light brownish gray (10YR 6/2) and yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine dark concretions; few fine flakes of mica; medium acid.

The thickness of the B horizon ranges from 35 to 80 inches. The soils are strongly acid to neutral. Most horizons have few or common flakes of mica.

The Ap or A horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 2 to 8. The upper part of the Bw horizon has hue of 5YR to 2.5Y, value of 4 to 7, and chroma of 3 to 8. The lower part has hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 1 to 8. The Bw horizon has few or common mottles with chroma of 2 or less or is mottled gray and brown in the lower part. It is

loam, sandy clay loam, or clay loam. The C horizon, if it occurs, is similar in color to the lower part of the Bw horizon. It is commonly stratified loam and sandy loam or loamy sand.

Congaree Series

The Congaree series consists of deep, moderately well drained or well drained, moderately permeable soils that formed in alluvium. These soils are on broad flood plains along large streams. Slopes range from 0 to 2 percent.

Typical pedon of Congaree loam; 5 miles northwest of Wentworth on Secondary Road 2150, about 4,400 feet east of the intersection of Secondary Road 2150 and Secondary Road 2151, and 600 feet south of Secondary Road 2150:

Ap—0 to 9 inches; brown (7.5YR 4/4) loam; weak fine granular structure; very friable; common fine and medium roots; few fine flakes of mica; strongly acid; clear smooth boundary.

C1—9 to 14 inches; reddish brown (5YR 4/4) sandy loam; massive; friable; common fine and medium roots; few fine flakes of mica; medium acid; clear wavy boundary.

C2—14 to 32 inches; brown (7.5YR 4/4) sandy clay loam; massive; friable; few fine and medium roots; few fine flakes of mica; few thin lenses of loamy fine sand; medium acid; clear wavy boundary.

C3—32 to 42 inches; brown (10YR 4/3) sandy loam; massive; friable; few fine and medium roots; common fine flakes of mica; medium acid; abrupt smooth boundary.

C4—42 to 50 inches; dark brown (10YR 3/3) silty clay loam; massive; friable; few fine and medium roots; few fine flakes of mica; slightly acid; clear smooth boundary.

C5—50 to 72 inches; brown (7.5YR 4/4) sandy clay loam; massive; friable; few fine and medium roots; few fine flakes of mica; medium acid.

The soils range from strongly acid to slightly acid. Most horizons have few or common flakes of mica.

The A horizon has hue of 10YR, 7.5YR, or 5YR, value of 3 to 5, and chroma of 3 to 6. The C horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 3 to 6. In some pedons it is mottled in shades of red, brown, or yellow. It is sandy loam, loam, sandy clay loam, or silty clay loam.

Creedmoor Series

The Creedmoor series consists of deep, moderately well drained, very slowly permeable soils that formed in material weathered from Triassic siltstone, mudstone, sandstone, or conglomerate. These soils are on broad uplands. Slopes range from 1 to 4 percent.

Typical pedon of Creedmoor fine sandy loam, 1 to 4 percent slopes; about 6.8 miles southwest of Eden, at the intersection of North Carolina Highway 135 and Secondary Road 2145; about 0.8 mile southeast on Secondary Road 2145 to entrance of Shiloh Airport; 1,900 feet southeast from entrance of Shiloh Airport on Secondary Road 2145 and 200 feet southwest of Secondary Road 2145, in an idle field:

Ap—0 to 7 inches; brown (10YR 4/3) fine sandy loam; weak fine granular structure; friable; many fine roots; strongly acid; abrupt smooth boundary.

E—7 to 11 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak coarse platy structure parting to moderate medium granular; friable; common fine roots; very strongly acid; clear smooth boundary.

Bt1—11 to 32 inches; strong brown (7.5YR 5/6) clay; common medium distinct pinkish gray (7.5YR 6/2) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; very firm, very sticky and very plastic; common fine roots; thin continuous light yellowish brown (10YR 6/4) clay films on faces of peds; extremely acid; clear wavy boundary.

Bt2—32 to 47 inches; reddish brown (5YR 4/4) clay; few fine distinct yellowish red (5YR 4/6) and common medium distinct pinkish gray (7.5YR 7/2) mottles; moderate coarse angular blocky structure; very firm, very sticky and very plastic; few fine roots; thick continuous clay films on faces of peds; extremely acid; gradual wavy boundary.

C—47 to 67 inches; dark reddish brown (2.5YR 3/4), yellowish red (5YR 5/6), and pinkish gray (7.5YR 7/2) saprolite that crushes to clay loam; massive; firm, sticky and plastic; few fine roots; extremely acid; gradual wavy boundary.

Cr—67 to 77 inches; dark reddish brown (2.5YR 3/4) fine grained sandstone that crushes to sandy loam.

The thickness of the Bt horizon ranges from 32 to 52 inches. The depth to hard bedrock is more than 5 feet. The soils are strongly acid to extremely acid unless limed.

The A or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 1 to 6. The E horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 5 or 6, and chroma of 2 to 4. It is fine sandy loam or sandy loam.

The Bt horizon has hue of 5YR to 2.5Y, value of 5 to 7, and chroma of 2 to 8. It is clay or silty clay loam that has thin layers of sandy clay loam in some pedons.

The C horizon is commonly mottled in hue of 5YR to

2.5Y, value of 3 to 7, and chroma of 1 to 8. It is weathered saprolite that crushes to clay loam, loam, sandy clay loam, or sandy loam.

Dogue Series

The Dogue series consists of deep, moderately well drained, moderately slowly permeable soils that formed in old alluvium. These soils are on low stream terraces. Slopes range from 0 to 4 percent.

Typical pedon of Dogue loam, 0 to 4 percent slopes; about 6.6 miles northeast of Eden on North Carolina Highway 770 to Courts-Durham farm road intersection (1.25 miles east of North Carolina Highway 770 and Secondary Road 1743 on North Carolina Highway 770); 3,900 feet south of North Carolina Highway 770 on Courts-Durham farm road; 1,100 feet east of farm road at a streambank; 2,100 feet south of streambank, in a field:

Ap—0 to 10 inches; brown (10YR 4/3) loam; weak fine granular structure; very friable; common fine and few medium roots; medium acid; clear smooth boundary.

Bt1—10 to 16 inches; light yellowish brown (10YR 6/4) clay loam; few fine distinct yellowish red (5YR 5/8) and few medium distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine roots; strongly acid; gradual wavy boundary.

Bt2—16 to 21 inches; light yellowish brown (10YR 6/4) clay; few fine distinct yellowish brown (10YR 5/8) and common medium distinct strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; thin continuous clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt3—21 to 28 inches; strong brown (7.5YR 5/8) clay; common medium distinct light brownish gray (10YR 6/2) and few fine distinct light yellowish brown (10YR 6/4) and red (10R 4/8) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; thin continuous clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt4—28 to 36 inches; mottled strong brown (7.5YR 5/8), light yellowish brown (10YR 6/4), light brownish gray (10YR 6/2), gray (10YR 6/1), brownish yellow (10YR 6/8), and yellowish brown (10YR 5/8) clay; moderate medium subangular blocky structure; firm, sticky and plastic; thin continuous clay films on faces of peds; few medium manganese concretions; very strongly acid; gradual wavy boundary.

Bt5—36 to 48 inches; strong brown (7.5YR 5/8) clay loam; few fine distinct pinkish gray (7.5YR 6/2) and common medium distinct gray (10YR 6/1) and yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; thin discontinuous clay films on faces of peds; very strongly acid; gradual wavy boundary.

C—48 to 72 inches; strong brown (7.5YR 5/8) fine sandy loam; common medium distinct gray (10YR 6/1), pale brown (10YR 6/3), and pinkish gray (7.5YR 6/2) mottles; massive; very friable; very strongly acid.

The Bt horizon generally ranges from 34 to 57 inches in thickness. In some pedons, however, it is thicker. The depth to bedrock is more than 5 feet. The soils are strongly acid to extremely acid unless limed.

The A or Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. The Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is dominantly clay or clay loam, but some pedons have thin layers of sandy clay loam. The C horizon has colors similar to those of the Bt horizon. It is commonly silt loam, sandy clay loam, fine sandy loam, or loamy sand. It may be stratified with these textures.

Helena Series

The Helena series consists of deep, moderately well drained, slowly permeable soils that formed in material weathered from coarse grained granite and other acid, crystalline rocks. These soils are in depressional areas on the lower side slopes and around the head of intermittent drainageways. Slopes range from 2 to 8 percent.

Typical pedon of Helena sandy loam, 2 to 8 percent slopes; about 9 miles southeast of Reidsville on North Carolina Highways 87 and 150 to Lenox Castle; 0.4 mile south of Lenox Castle on Secondary Road 2613 and 0.2 mile west of Secondary Road 2613, in a stand of Virginia pine:

O1—6 to 3 inches; undecomposed forest litter, mainly Virginia pine needles and twigs.

O2—3 inches to 0; decomposed forest litter.

A—0 to 5 inches; brown (10YR 5/3) sandy loam; weak fine granular structure; very friable; common fine and medium and few coarse roots; very strongly acid; clear smooth boundary.

E—5 to 12 inches; light yellowish brown (2.5Y 6/4) sandy loam; weak fine granular structure; very friable; common fine and medium and few coarse roots; very strongly acid; gradual wavy boundary.

Bt1—12 to 16 inches; brownish yellow (10YR 6/6) sandy clay loam; few fine distinct reddish yellow

(5YR 6/8) mottles; weak medium subangular blocky structure; friable; few fine roots; very strongly acid; gradual wavy boundary.

Bt2—16 to 24 inches; brownish yellow (10YR 6/6) clay; common fine distinct light yellowish brown (10YR 6/4), light gray (10YR 7/2), and red (2.5YR 4/8) mottles; moderate medium angular blocky structure; firm, sticky and plastic; thin continuous clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt3—24 to 31 inches; light yellowish brown (10YR 6/4) clay; many medium light gray (10YR 7/2), common medium distinct brown (7.5YR 5/2), and few fine distinct red (2.5YR 4/8) and brownish yellow (10YR 6/8) mottles; moderate medium angular blocky structure; firm, sticky and plastic; thin continuous clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt4—31 to 42 inches; strong brown (7.5YR 5/8) clay loam; many medium distinct light gray (10YR 7/1), common medium distinct brownish yellow (10YR 6/6), and few fine distinct red (2.5YR 4/8) mottles; moderate medium angular blocky structure; firm, sticky and plastic; thin discontinuous clay films on faces of peds; very strongly acid; gradual wavy boundary.

C—42 to 60 inches; mottled strong brown (7.5YR 5/8), yellowish red (5YR 5/8), light gray (10YR 7/2), and white (10YR 8/1) saprolite that crushes to sandy loam; massive; friable; very strongly acid.

The thickness of the B horizon ranges from 22 to 38 inches. The depth to bedrock is more than 4 feet. The soils are strongly acid or very strongly acid unless limed.

The A or Ap horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4. The E horizon has hue of 10YR or 2.5Y, value of 6, and chroma of 4. It is sandy loam, loam, or loamy sand.

The Bt horizon generally has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 3 to 8. In some pedons it has chroma of 2 in the lower part. It has mottles with chroma of 2 or less in the upper 24 inches. This horizon is dominantly sandy clay, clay, or clay loam, but it has thin layers of sandy clay loam or loam in most pedons.

The C horizon is multicolored saprolite derived from weathered acid crystalline rocks. It crushes to sandy loam, sandy clay loam, or loam.

Hiwassee Series

The Hiwassee series consists of deep, well drained, moderately permeable soils that formed in old alluvium or in material weathered from diorite, gabbro schist, and hornblende. These soils are on high stream terraces and on broad ridges. Slopes range from 2 to 15 percent.

Typical pedon of Hiwassee loam, 2 to 8 percent slopes; about 6.8 miles south of Eden, to the intersection of Secondary Roads 2132 and 2133; about 2.4 miles east to the end of Secondary Road 2132, in a plowed field:

Ap—0 to 10 inches; dark reddish brown (5YR 3/4) loam; moderate medium granular structure; friable; common fine roots; few rounded pebbles; medium acid; clear smooth boundary.

Bt1—10 to 31 inches; dark red (2.5YR 3/6) clay loam; moderate medium subangular blocky structure; friable, sticky and plastic; few fine roots; thin continuous clay films on faces of peds; few fine flakes of mica; strongly acid; gradual smooth boundary.

Bt2—31 to 52 inches; dark red (2.5YR 3/6) clay; moderate medium subangular blocky structure; firm, sticky and plastic; thin continuous clay films on faces of peds; few fine flakes of mica; strongly acid; gradual wavy boundary.

Bt3—52 to 64 inches; red (2.5YR 4/6) clay loam; weak medium subangular blocky structure; friable, sticky and plastic; thin patchy clay films on faces of peds; few fine flakes of mica; strongly acid; gradual wavy boundary.

C—64 to 80 inches; red (2.5YR 4/6) saprolite that crushes to sandy clay loam; massive; friable; medium acid.

The thickness of the Bt horizon ranges from 47 to 67 inches. The depth to bedrock is more than 5 feet. The soils are very strongly acid or medium acid.

The A or Ap horizon has hue of 5YR or 2.5YR, value of 3, and chroma of 3 to 6. The part of the Bt horizon within a depth of about 40 inches has hue of 10R or 2.5YR, value of 3, and chroma of 4 to 6. The part below a depth of about 40 inches has hue of 10R to 5YR, value of 3 to 5, and chroma of 3 to 8. The Bt horizon is clay, clay loam, or sandy clay. The C horizon has hue of 10R to 10YR, value of 3 to 5, and chroma of 4 to 8, or it is mottled or streaked with these colors. It is saprolite that crushes to clay loam, loam, sandy clay loam, or sandy loam.

Iredell Series

The Iredell series consists of deep, moderately well drained or somewhat poorly drained, slowly permeable soils that formed in material weathered from diorite, gabbro schist, and other rocks high in content of

ferromagnesian minerals. These soils are on flats, in concave areas, and around the head of intermittent drainageways. Slopes range from 2 to 15 percent.

Typical pedon of Iredell fine sandy loam, 2 to 8 percent slopes; about 2.5 miles south of Reidsville, at the intersection of U.S. Highway 29 Business and Secondary Road 2437; about 0.6 mile southwest on Secondary Road 2437; 700 feet northeast of the intersection of Secondary Roads 2443 and 2437, in a hardwood forest:

O1—2 inches to 1 inch; undecomposed leaves and twigs.

O2—1 inch to 0; partially decomposed leaves and twigs.

A—0 to 4 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; few fine quartz pebbles; few fine black concretions; medium acid; clear smooth boundary.

E—4 to 8 inches; light olive brown (2.5Y 5/4) fine sandy loam; weak fine granular structure; very friable; common fine and medium roots; few fine quartz pebbles; few fine black concretions; slightly acid; abrupt smooth boundary.

Bt1—8 to 18 inches; yellowish brown (10YR 5/6) clay; few medium distinct pale brown (10YR 6/3) mottles in root channels; moderate medium angular blocky structure; very firm, very sticky and very plastic; few fine, medium, and coarse roots; thick continuous clay films on faces of peds and in root channels; common slickensides; few fine weathered hornblende fragments; neutral; gradual smooth boundary.

Bt2—18 to 22 inches; yellowish brown (10YR 5/6) clay; few medium distinct light brownish gray (2.5Y 6/2) mottles; moderate medium angular blocky structure; very firm, very sticky and very plastic; few coarse roots; thick continuous clay films on faces of peds and in root channels; common slickensides; common weathered hornblende fragments; neutral; gradual smooth boundary.

Bt3—22 to 25 inches; olive brown (2.5Y 4/4) clay; few fine distinct light brownish gray (2.5Y 6/2) mottles; moderate medium angular blocky structure; very firm, very sticky and very plastic; thick continuous clay films on faces of peds and in root channels; many weathered hornblende fragments; neutral; clear wavy boundary.

Bt4—25 to 28 inches; olive brown (2.5Y 4/4) clay loam; few medium distinct grayish brown (2.5Y 5/2) mottles; moderate medium angular blocky structure; firm, sticky and plastic; thin discontinuous clay films on faces of peds; many weathered hornblende fragments; neutral; clear smooth boundary.

C—28 to 60 inches; mottled dark greenish gray (5G 4/1), black (5Y 2/1), yellowish brown (10YR 5/6), and grayish brown (2.5Y 5/2) saprolite that crushes to sandy loam; massive; neutral.

The thickness of the Bt horizon ranges from 16 to 35 inches. The depth to hard bedrock is more than 5 feet. The soils are medium acid to mildly alkaline.

The A or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 1 to 4. The E horizon has hue of 2.5Y or 10YR, value of 4 to 6, and chroma of 2 to 4.

The Bt horizon has hue of 2.5Y or 10YR and value and chroma of 4 to 6. It is dominantly clay, but it has thin layers of clay loam or sandy clay loam in most pedons.

The C horizon is multicolored saprolite that crushes to sandy loam or sandy clay loam.

Leaksville Series

The Leaksville series consists of moderately deep, poorly drained or somewhat poorly drained, slowly permeable soils that formed in material weathered from Triassic shale. These soils are in broad, slightly concave depressions around the head of drainageways and along intermittent drainageways. Slopes range from 0 to 4 percent.

Typical pedon of Leaksville silt loam, 0 to 4 percent slopes; about 0.25 mile east of Eden on North Carolina Highway 770; about 900 feet north of North Carolina Highway 770, in a pasture:

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; many fine and medium roots; about 10 percent partially weathered shale fragments as much as 1 inch in size; few fine black concretions; slightly acid; clear smooth boundary.

E—6 to 9 inches; light brownish gray (2.5Y 6/2) channery silt loam; common medium distinct light yellowish brown (2.5Y 6/4) and common fine distinct yellowish brown (10YR 5/8) mottles; weak medium granular structure; friable; common fine and few medium roots; about 30 percent partially weathered shale fragments as much as 2 inches in size; few fine and medium dark concretions; medium acid; abrupt wavy boundary.

Btg—9 to 18 inches; dark grayish brown (2.5Y 4/2) clay; common fine distinct yellowish brown (10YR 5/8) and few medium faint grayish brown (2.5Y 5/2) mottles; weak medium prismatic structure; very firm,

very sticky and very plastic; few fine and medium roots; about 10 percent partially weathered shale fragments as much as 2 inches in size; few fine dark concretions; slightly acid; clear wavy boundary.

C/Bt—18 to 24 inches; dark grayish brown (2.5Y 4/2) very channery silty clay loam; common medium distinct yellowish brown (10YR 5/8) and few fine faint grayish brown mottles; weak medium platy structure; firm, sticky and plastic; few fine roots in cracks and in seams of shale; about 60 percent partially weathered shale fragments as much as 3 inches in size; few thin patchy clay films on faces of peds and on fracture lines of shale; few dark concretions; few medium threads and bodies of light gray (2.5Y 7/2) calcium carbonate that is slightly effervescent; neutral; abrupt irregular boundary.

Cr—24 to 30 inches; dark grayish brown (10YR 4/2), brownish yellow (10YR 6/8), and light gray (2.5Y 7/2), moderately hard shale with few bodies of dark grayish brown (2.5Y 4/2) clay in cracks; few fine roots in cracks and seams of shale; few light gray (2.5Y 7/2) threads and bodies of calcium carbonate that is strongly effervescent; difficult to cut with a spade; neutral.

R—30 inches; hard, dark shale.

The Bt horizon is 4 to 20 inches thick. Depth to the Cr horizon is 20 to 40 inches, and the depth to hard bedrock is 24 to 60 inches. Reaction ranges from strongly acid to slightly acid in the A horizon and from slightly acid to mildly alkaline in the Bt and C/Bt horizons. In some pedons the C/Bt and Cr horizons have few or common threads or bodies of grayish calcium carbonate. The content of coarse fragments of shale and quartz gravel ranges from 2 to 35 percent in the A horizon, from 2 to 15 percent in the Bt horizon, and from 35 to 85 percent in the C/Bt and Cr horizons.

The A or Ap horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 to 4. The E horizon, if it occurs, has hue of 10YR, 2.5Y, or 5Y, value of 5 to 7, and chroma of 2 to 4. It is loam, silt loam, silty clay loam, or the channery analogs of those textures.

The Btg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. It is mottled in shades of gray, brown, or yellow. It is clay, silty clay, or clay loam.

The C/Bt or Bt/C horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. It is mottled in shades of gray, brown, or yellow. It is very channery clay loam, very channery silty clay loam, or very channery loam.

The Cr horizon is partially weathered soft shale. The R horizon is hard, dark shale.

Madison Series

The Madison series consists of deep, well drained, moderately permeable soils that formed in material weathered from mica schist and mica gneiss. These soils are on narrow ridges and in sloping areas around drainageways. Slopes range from 2 to 35 percent.

Typical pedon of Madison sandy loam, 15 to 35 percent slopes; about 2.8 miles south of Price, at the intersection of U.S. Highway 220 and Secondary Road 1630; about 2,000 feet northwest of the intersection of Secondary Roads 1360 and 1376 on Secondary Road 1376 and 200 feet east of Secondary Road 1376, in a mixed stand of Virginia pine and hardwoods:

A—0 to 3 inches; brown (7.5YR 5/4) sandy loam; weak fine granular structure; very friable; common fine flakes of mica; strongly acid; clear smooth boundary.

E—3 to 8 inches; dark brown (7.5YR 4/4) sandy loam; weak fine granular structure; very friable; common fine flakes of mica; strongly acid; clear smooth boundary.

Bt1—8 to 25 inches; red (2.5YR 4/6) clay; moderate medium subangular blocky structure; friable, sticky and plastic; common distinct clay films on faces of peds; many fine and medium flakes of mica; strongly acid; gradual wavy boundary.

Bt2—25 to 31 inches; red (2.5YR 4/8) clay loam; weak medium subangular blocky structure; friable, sticky and plastic; few distinct clay films on faces of peds; many fine and medium flakes of mica; strongly acid; gradual irregular boundary.

C—31 to 60 inches; red (2.5YR 4/8) saprolite of mica schist that crushes to sandy loam; massive; very friable; many fine and medium flakes of mica; strongly acid.

The thickness of the Bt horizon ranges from 14 to 30 inches. The soils are very strongly acid or strongly acid unless limed.

The A or Ap horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 3 to 8. It is sandy loam or sandy clay loam.

The E horizon, if it occurs, has hue of 7.5YR to 10YR, value of 3 to 5, and chroma of 3 to 6. It is fine sandy loam or sandy loam.

The Bt horizon has hue of 10R to 5YR, value of 4 to 6, and chroma of 3 to 8. It is dominantly clay, sandy clay, or clay loam, but it has thin layers of sandy clay loam in some pedons.

The C horizon has hue of 10R to 5YR, value of 4 to 6, and chroma of 2 to 8 or is mottled with these colors. It is saprolite that crushes to sandy loam or sandy clay loam.

Mayodan Series

The Mayodan series consists of deep, well drained, moderately permeable soils that formed in material weathered from Triassic sandstone, siltstone, and conglomerate. These soils are on broad, smooth ridges and moderately steep hillsides around drainageways. Slopes range from 2 to 25 percent.

Typical pedon of Mayodan sandy clay loam, 2 to 8 percent slopes, eroded; about 7 miles southwest of Eden to the intersection of North Carolina Highway 135 and Secondary Road 2145; about 0.6 mile northwest on Secondary Road 2145; about 200 feet southwest of Secondary Road 2145, in a wheat field:

Ap—0 to 7 inches; yellowish red (5YR 5/8) sandy clay loam; weak medium granular structure; friable; common fine roots; few small sandstone and quartzite fragments; strongly acid; clear smooth boundary.

Bt1—7 to 24 inches; red (2.5YR 4/8) clay; moderate medium subangular blocky structure; firm, sticky and plastic; few fine and medium roots; thin discontinuous clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual smooth boundary.

Bt2—24 to 38 inches; red (2.5YR 5/8) clay loam; few fine distinct strong brown (7.5YR 5/8) and common medium faint red (2.5YR 4/8) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; few medium roots; thin discontinuous clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Bt3—38 to 50 inches; red (2.5YR 4/8) clay loam; common medium distinct strong brown (7.5YR 5/8) mottles and streaks of highly weathered sandstone; weak coarse subangular blocky structure; friable, sticky and plastic; few medium roots; thin discontinuous clay films on faces of peds; few fine flakes of mica; strongly acid; gradual wavy boundary.

C—50 to 72 inches; red (2.5YR 4/8), strong brown (7.5YR 5/8), reddish yellow (7.5YR 6/8), and dark gray (10YR 4/1) saprolite that crushes to sandy loam; massive; firm; strongly acid.

The thickness of the Bt horizon ranges from 15 to 45 inches. The depth to bedrock is more than 6 feet. The soils are very strongly acid or strongly acid unless limed.

The A or Ap horizon has hue of 2.5YR to 2.5Y, value of 2 to 6, and chroma of 2 to 8. It is sandy loam or sandy clay loam.

The E horizon, if it occurs, has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 3 or 4. It is sandy loam or fine sandy loam.

The Bt horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 3 to 8. It is clay loam, clay, or sandy clay.

The C horizon is multicolored saprolite that crushes to loam, clay loam, or sandy loam.

Mecklenburg Series

The Mecklenburg series consists of deep, well drained, slowly permeable soils that formed in material weathered from diorite, gabbro schist, and hornblende. These soils are on broad ridges and in gently sloping areas above drainageways. Slopes range from 2 to 8 percent.

Typical pedon of Mecklenburg sandy clay loam, 2 to 8 percent slopes, eroded; about 2.5 miles south of Reidsville, at the intersection of U.S. Highway 29 Business and Secondary Road 2437; about 0.6 mile southwest on Secondary Road 2437 and 600 feet northeast of the intersection of Secondary Roads 2437 and 2443, in a plowed field:

Ap—0 to 7 inches; yellowish red (5YR 5/6) sandy clay loam; weak medium granular structure; friable; common fine and medium roots; about 15 percent feldspar, quartzite, and hornblende gneiss fragments; slightly acid; abrupt smooth boundary.

Bt—7 to 22 inches; yellowish red (5YR 5/8) clay; moderate medium subangular blocky structure; firm, sticky and plastic; few fine roots; common distinct clay films on faces of peds; common medium manganese concretions; neutral; gradual smooth boundary.

BC—22 to 30 inches; yellowish red (5YR 5/6) clay loam; weak medium subangular blocky structure; friable, sticky and plastic; few fine roots; few distinct clay films on faces of peds; common weathered black and strong brown hornblende and feldspar fragments; few medium manganese concretions; neutral; gradual wavy boundary.

C1—30 to 45 inches; yellowish red (5YR 5/8) and white (10YR 8/2) saprolite that crushes to sandy clay loam; massive; friable; neutral; clear smooth boundary.

C2—45 to 72 inches; yellowish red (5YR 5/8) and black (10YR 2.5/1) saprolite that crushes to sandy loam; massive; neutral.

The thickness of the Bt horizon ranges from 12 to 33 inches. The depth to bedrock is more than 4 feet. The soils are medium acid to neutral.

The A or Ap horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. The Bt horizon has hue

of 2.5YR or 5YR, value of 3 to 6, and chroma of 4 to 8. The BC horizon has hue of 2.5YR to 7.5YR, value of 4 to 7, and chroma of 4 to 8. It is clay loam or sandy clay loam. The C horizon is multicolored saprolite derived from mafic crystalline rock. It crushes to loam, sandy loam, or sandy clay loam.

Pacolet Series

The Pacolet series consists of deep, well drained, moderately permeable soils on dissected uplands. These soils formed in material weathered from acid, crystalline rocks consisting mainly of mixed gneiss and schist. Slopes range from 8 to 40 percent.

Typical pedon of Pacolet sandy loam, 15 to 25 percent slopes; about 1.5 miles southeast of Bakers Crossroads, at the intersection of Secondary Roads 2363 and 2380; about 1,000 feet northeast on Secondary Road 2380; about 600 feet southeast of the intersection of Secondary Road 2363 and Rock House Creek, in an area of hardwoods:

A—0 to 2 inches; brown (10YR 4/3) sandy loam; weak fine granular structure; very friable; common fine and medium roots; very strongly acid; clear smooth boundary.

E—2 to 6 inches; dark yellowish brown (10YR 4/4) sandy loam; weak fine granular structure; very friable; common fine and medium roots; very strongly acid; clear smooth boundary.

Bt1—6 to 9 inches; yellowish red (5YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt2—9 to 16 inches; red (2.5YR 5/8) clay loam; moderate medium subangular blocky structure; friable, slightly sticky; common distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt3—16 to 25 inches; red (2.5YR 4/8) clay; moderate medium subangular blocky structure; firm, slightly sticky; common distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

BC—25 to 35 inches; red (2.5YR 5/8) sandy clay loam; weak medium subangular blocky structure; friable; few distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

C—35 to 60 inches; red (2.5YR 4/8) saprolite that crushes to sandy loam; massive; friable; very strongly acid.

The thickness of the Bt horizon ranges from 12 to 24 inches. The depth to bedrock is more than 5 feet. The soils are very strongly acid or strongly acid unless limed.

The A or Ap horizon has hue of 5YR, 7.5YR, or 10YR, value of 3 to 5, and chroma of 3 to 8. It is sandy loam or, in eroded areas, sandy clay loam.

The E horizon, if it occurs, has hue of 5YR to 10YR, value of 4 to 6, and chroma of 3 to 8. It is sandy loam, fine sandy loam, or loamy sand.

The Bt horizon has hue of 10R to 5YR, value of 4 or 5, and chroma of 6 to 8. It is sandy clay loam, clay loam, or clay.

The BC horizon, if it occurs, has hue of 10R to 5YR, value of 4 or 5, and chroma of 6 to 8, or it is mottled in shades of red, yellow, or brown. It is sandy clay loam, loam, or clay loam.

The C horizon has hue of 10R to 5YR, value of 4 to 8, and chroma of 8, or it is mottled in shades of red, yellow, brown, or white. It is saprolite derived from acid crystalline rocks. It crushes to sandy loam, loam, or sandy clay loam.

Pinkston Series

The Pinkston series consists of moderately deep, well drained to excessively drained, moderately rapidly permeable soils that formed in material weathered from Triassic sandstone and conglomerate. These soils are on narrow ridges, steep side slopes, and bluffs. Slopes range from 6 to 45 percent.

Typical pedon of Pinkston fine sandy loam, 15 to 45 percent slopes; about 5 miles northwest of Wentworth on Secondary Road 2150, about 5,000 feet west of Settles Bridge, 50 feet north of Secondary Road 2150:

O1—2 inches to 1 inch; mixture of undecomposed leaves and pine needles.

O2—1 inch to 0; partially decomposed leaves and pine needles.

A—0 to 5 inches; dark reddish gray (5YR 4/2) fine sandy loam; weak fine granular structure; very friable; common fine and medium roots; about 10 percent, by volume, sandstone fragments as much as 1 inch in size; very strongly acid; clear smooth boundary.

Bw—5 to 16 inches; reddish brown (2.5YR 4/4) gravelly sandy loam; weak fine subangular blocky structure; friable; few fine roots; about 20 percent, by volume, coarse sandstone fragments as much as 1 inch in size; small irregularly shaped bodies of sandy clay loam; very strongly acid; clear irregular boundary.

C—16 to 23 inches; reddish brown (2.5YR 5/4) saprolite that crushes to very gravelly sandy loam; massive; friable; about 40 percent partially weathered dark reddish brown sandstone fragments; very strongly acid.

R—23 inches; hard, dark reddish brown (2.5YR 3/4) sandstone.

The thickness of the B horizon ranges from 6 to 22 inches. The depth to bedrock ranges from 20 to 40 inches. The soils are strongly acid or very strongly acid.

The A horizon has hue of 5YR to 10YR, value of 3 or 4, and chroma of 2 to 4. The E horizon, if it occurs, has hue of 10YR and value and chroma of 4. It is fine sandy loam or sandy loam.

The Bw horizon has hue of 2.5YR to 10YR, value of 4 or 5, and chroma of 2 to 8. It is dominantly sandy loam, loam, or the gravelly analogs of those textures but has small bodies of clay loam or sandy clay loam.

The C horizon has hue of 2.5YR to 10YR, value of 4 to 8, and chroma of 1 to 8, or it is mottled in shades of brown, pink, purple, red, white, or yellow. It is saprolite derived from sedimentary rock. It crushes to sandy loam, fine sandy loam, or the gravelly or very gravelly analogs of those textures.

Rion Series

The Rion series consists of deep, well drained, moderately permeable soils that formed in material weathered from acid, crystalline rocks. These soils are in hilly areas on relatively narrow, gently sloping ridgetops and moderately steep side slopes. Slopes range from 2 to 30 percent.

Typical pedon of Rion sandy loam, 2 to 8 percent slopes; about 1.75 miles northwest of Reidsville city limits on Secondary Road 1998, then 3,400 feet northwest of Salem Church on Upper Piedmont Research Station; 300 feet west of field road on Upper Piedmont Research Station:

Ap—0 to 10 inches; yellowish brown (10YR 5/4) sandy loam; weak fine granular structure; very friable; common fine and medium roots; about 5 percent, by volume, quartzite and granite gneiss fragments; few fine flakes of mica; slightly acid; clear smooth boundary.

Bt1—10 to 23 inches; strong brown (7.5YR 5/6) sandy clay loam; common medium distinct reddish yellow (7.5YR 6/8) and few fine distinct yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; friable; common fine and medium roots; thin discontinuous clay films on faces of peds; few fine flakes of mica; medium acid; clear smooth boundary.

Bt2—23 to 34 inches; strong brown (7.5YR 5/6) sandy clay loam; common medium distinct reddish yellow (7.5YR 6/8) and red (2.5YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine roots; thin discontinuous clay films on faces of peds; few fine flakes of mica; strongly acid; gradual wavy boundary.

C1—34 to 39 inches; mottled strong brown (7.5YR 5/6), reddish yellow (7.5YR 6/8), and yellowish red (5YR 5/8) saprolite that crushes to sandy loam; massive; friable; very strongly acid; gradual smooth boundary.

C2—39 to 60 inches; yellow (10YR 7/6) saprolite that crushes to loamy sand; massive; friable; very strongly acid.

The thickness of the B horizon ranges from 15 to 33 inches. The depth to bedrock is more than 5 feet. The soils are slightly acid to very strongly acid.

The A or Ap horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 6. The E horizon, if it occurs, has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. It is sandy loam or loamy sand.

The Bt horizon has hue of 10YR to 2.5YR, value of 4 to 6, and chroma of 6 to 8. It typically has mottles in shades of yellow and red. It is sandy clay loam, clay loam, or loam.

The C horizon commonly is mottled in shades of red, brown, yellow, or white. It is saprolite derived from acid crystalline rocks. It is massive but crushes to sandy loam, sandy clay loam, or loamy sand.

Sedgefield Series

The Sedgefield series consists of deep, moderately well drained or somewhat poorly drained, slowly permeable soils that formed in material weathered from mixed mafic and felsic rocks. These soils are in depressions on the lower slopes and around the head of intermittent drainageways. Slopes range from 2 to 8 percent.

Typical pedon of Sedgefield sandy loam, 2 to 8 percent slopes; about 2.5 miles south of Reidsville, at the intersection of U.S. Highway 29 Business and Secondary Road 2437; about 1 mile southwest on Secondary Road 2437, at the intersection of Secondary Road 2436; about 3,100 feet east on Secondary Road 2436 and 700 feet north of Secondary Road 2436:

Ap—0 to 4 inches; dark grayish brown (10YR 4/2) sandy loam; weak fine granular structure; very friable; many fine and medium roots; few medium manganese concretions; strongly acid; clear smooth boundary.

BE—4 to 11 inches; brownish yellow (10YR 6/6) sandy clay loam; weak fine subangular blocky structure; friable; common fine and medium roots; few faint clay films on faces of peds; few medium manganese concretions; few small quartz fragments; strongly acid; clear wavy boundary.

Bt1—11 to 25 inches; yellowish brown (10YR 5/8) clay;

common medium distinct strong brown (7.5YR 5/8) and light gray (10YR 7/2) and few fine distinct red (2.5YR 5/8) mottles on faces of peds and in old root channels; moderate medium angular blocky structure; very firm, sticky and plastic; few fine roots; common distinct clay films on faces of peds and in old root channels; strongly acid; gradual wavy boundary.

Bt2—25 to 35 inches; yellowish brown (10YR 5/8) clay loam; common medium distinct light gray (10YR 7/2) mottles on faces of peds and in old root channels; weak medium angular blocky structure; firm, sticky and plastic; few distinct clay films on faces of peds; common strong brown (7.5YR 5/8), highly weathered feldspar fragments; strongly acid; gradual wavy boundary.

C—35 to 60 inches; yellowish brown (10YR 5/8), strong brown (7.5YR 5/8), very dark grayish brown (10YR 3/2), and light gray (10YR 7/2) saprolite that crushes to sandy loam; massive; friable; medium acid.

The thickness of the Bt horizon ranges from 14 to 24 inches. The depth to bedrock is more than 4 feet. The soils are very strongly acid to slightly acid in the A and B horizons and medium acid to moderately alkaline in the C horizon.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. The E horizon, if it occurs, has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. It is sandy loam or fine sandy loam.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 2 to 8. It is clay loam, clay, or sandy clay.

The C horizon is mottled gray, brown, yellow, or olive saprolite that crushes to sandy loam and loam.

Spray Series

The Spray series consists of deep, well drained, moderately permeable soils that formed in material weathered from Triassic shale. These soils are in broad, smooth or convex areas between intermittent drainageways. Slopes range from 0 to 5 percent.

Typical pedon of Spray loam, 0 to 5 percent slopes; about 5.4 miles east of Eden, at the intersection of North Carolina Highway 770 and Secondary Road 1743; about 2,300 feet north on Secondary Road 1743 and 200 feet east of Secondary Road 1743:

Ap—0 to 6 inches; dark brown (7.5YR 4/4) loam; weak fine granular structure; very friable; many coarse, medium, and fine roots; few fragments of weathered shale; very strongly acid; clear wavy boundary.

Bt—6 to 17 inches; reddish brown (5YR 4/4) clay; weak medium subangular blocky structure; friable, sticky and plastic; common fine and medium roots; common distinct clay films on faces of peds; common fragments of shale as much as 1 inch in size; strongly acid; clear smooth boundary.

C—17 to 60 inches; reddish brown (5YR 4/4) saprolite of shale and silt loam; massive, parting to thin shale fragments; friable; few fine roots between the seams of the shale fragments; about 75 to 85 percent is broken, partially weathered, brownish yellow (10YR 6/6) and very dark gray (10YR 3/1) shale fragments as much as 1 inch in size; few bodies of reddish brown (5YR 4/4) silty clay loam on faces of peds and between seams of shale; cuts easily with spade; medium acid.

The loamy and clayey horizons are 10 to 30 inches deep over partially weathered shale. The thickness of the Bt horizon ranges from 6 to 17 inches. The depth to hard bedrock is more than 5 feet. Reaction is strongly acid or very strongly acid in the A horizon and ranges from strongly acid to slightly acid in the Bt horizon. The content of coarse fragments of shale and quartz gravel ranges from 5 to 15 percent in the A horizon and from 5 to 20 percent in the Bt horizon.

The A or Ap horizon has hue of 5YR, 7.5YR, or 10YR, value of 3 to 5, and chroma of 2 to 4. The Bt horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 3 to 8. It is silty clay loam, clay loam, clay, silty clay, or the gravelly analogs of those textures. Some pedons have thin transitional horizons of loam. The C horizon has hue of 2.5YR or 5YR, value of 3 to 6, and chroma of 2 to 4. It is saprolite that crushes to silty clay loam, silt loam, or loam. The content of shale fragments in this horizon ranges from 50 to 80 percent, by volume. These fragments are typically reddish, but some strata include brown, gray, or yellowish fragments.

Stoneville Series

The Stoneville series consists of deep, well drained, moderately permeable soils that formed in material weathered from Triassic siltstone, mudstone, sandstone, conglomerate, and shale. These soils are on uplands. Slopes range from 2 to 25 percent.

Typical pedon of Stoneville loam, 15 to 25 percent slopes; southwest of Stoneville, about 0.75 mile south of the intersection of U.S. Highway 220 Business and U.S. Highway 220 bypass; 600 feet west of U.S. Highway 220 bypass, in a wooded area:

A—0 to 5 inches; dark reddish brown (5YR 3/3) loam;

moderate fine granular structure; very friable, sticky; common fine to coarse roots; few pebble-sized fragments of siltstone; strongly acid; clear smooth boundary.

BA—5 to 13 inches; dark reddish brown (5YR 3/3) loam; weak fine subangular blocky structure; friable, sticky; few fine and medium roots; strongly acid; gradual wavy boundary.

Bt1—13 to 32 inches; dark reddish brown (2.5YR 3/4) clay; moderate medium subangular blocky structure; firm, sticky and slightly plastic; few fine and medium roots; thin continuous clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Bt2—32 to 38 inches; dark reddish brown (2.5YR 3/4) clay loam; weak fine subangular blocky structure; friable, sticky and slightly plastic; few fine roots; common fine flakes of mica; very strongly acid; gradual wavy boundary.

C—38 to 48 inches; dark reddish brown (5YR 3/4) saprolite of siltstone and mudstone that crushes to loam with few seams of clay loam; massive; friable; common flakes of mica; very strongly acid; gradual wavy boundary.

Cr—48 to 72 inches; dark reddish brown (5YR 3/4), moderately hard siltstone and mudstone; massive; very firm; very strongly acid.

The depth to moderately hard bedrock ranges from 40 to 60 inches. Reaction ranges from medium acid to very strongly acid unless the surface has been limed. The content of pebbles of siltstone and mudstone ranges from 0 to 10 percent, by volume, throughout the profile.

The A or Ap horizon has hue of 7.5YR to 10R, value of 3 or less, and chroma of 2 to 6. The BA horizon, if it occurs, has hue of 5YR to 10R, value of 3 or less, and chroma of 2 to 6. It is loam or silt loam. The Bt horizon has hue of 2.5YR or 10R, value of 3 or less, and chroma of 3 to 6. In some pedons it has yellowish, brownish, or dark red mottles. It is clay, silty clay, clay loam, or silty clay loam. The BC horizon, if it occurs, has colors similar to those of the Bt horizon. In some pedons it has yellowish, brownish, grayish, or dark red mottles. It is clay loam or silty clay loam.

The C horizon has hue of 5YR to 10R, value of 2 to 4, and chroma of 2 to 6. In some pedons it has yellowish, brownish, grayish, or dark red mottles. It is saprolite of mudstone, siltstone, sandstone, shale, or conglomerate that crushes to silt loam or loam.

The Cr horizon is similar in color to the C horizon and is moderately hard siltstone, mudstone, sandstone, shale, or conglomerate. Some pedons have hard bedrock below a depth of 40 inches.

Vance Series

The Vance series consists of deep, well drained, slowly permeable soils that formed in material weathered from coarse grained granite and other acid, crystalline rocks. These soils are on ridges and side slopes. Slopes range from 2 to 15 percent.

Typical pedon of Vance sandy loam, 2 to 8 percent slopes; southeast of Williamsburg on Secondary Road 2619; about 1.4 miles southeast of the intersection of North Carolina Highway 150 and Secondary Road 2619; about 1,200 feet north of Secondary Road 2619 on farm road; 50 feet east of farm road, in a field:

Ap—0 to 8 inches; yellowish brown (10YR 5/4) sandy loam; weak fine granular structure; very friable; common fine roots; about 2 percent quartzite fragments; slightly acid; abrupt smooth boundary.

Bt1—8 to 21 inches; strong brown (7.5YR 5/8) clay; common medium distinct brownish yellow (10YR 6/6) and light yellowish brown (10YR 6/4) and common fine distinct yellowish red (5YR 5/8) mottles; moderate medium angular blocky structure; very firm, very sticky and plastic; few fine roots massed along faces of peds; many distinct clay films on faces of peds; few fine flakes of mica; strongly acid; gradual wavy boundary.

Bt2—21 to 27 inches; strong brown (7.5YR 5/6) clay; common medium distinct brownish yellow (10YR 6/6 and 6/8) and light yellowish brown (10YR 6/4) and common fine prominent red (2.5YR 4/8) mottles; moderate medium angular blocky structure; very firm, very sticky and plastic; few fine roots along faces of peds; many distinct clay films on faces of peds; few fine flakes of mica; strongly acid; gradual wavy boundary.

Bt3—27 to 36 inches; strong brown (7.5YR 5/6) clay loam; common medium distinct brownish yellow (10YR 6/6 and 6/8) and light yellowish brown (10YR 6/4), common medium prominent red (2.5YR 4/8), and common fine prominent white (10YR 8/2) mottles; moderate medium angular blocky structure; firm, sticky and plastic; common distinct clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual wavy boundary.

C1—36 to 50 inches; mottled strong brown (7.5YR 5/6), brownish yellow (10YR 6/6), white (10YR 8/2), and red (2.5YR 4/8) saprolite that crushes to sandy clay loam; massive; friable; few fine flakes of mica; very strongly acid; gradual wavy boundary.

C2—50 to 60 inches; mottled strong brown (7.5YR 5/6), brownish yellow (10YR 6/6), white (10YR 8/2), and red (2.5YR 4/8) saprolite that crushes to sandy

loam; massive; friable; few fine flakes of mica; very strongly acid.

The thickness of the Bt horizon ranges from 17 to 35 inches. The depth to bedrock is more than 5 feet. The soils are strongly acid or very strongly acid unless limed.

The A or Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. The E horizon, if it occurs, has hue of 10YR or 7.5YR, value of 5 to 7, and chroma of 3 to 6. It is fine sandy loam or sandy loam.

The Bt horizon has hue of 5YR to 10YR, value of 5 or 6, and chroma of 6 to 8. It has mottles in shades of red, brown, or yellow in most pedons. It is dominantly clay, clay loam, or sandy clay, but it has thin layers of sandy clay loam in some pedons.

The C horizon is saprolite that is coarsely mottled in hue of 5YR to 2.5Y, value of 4 to 8, and chroma of 1 to 8. It is massive but crushes to clay loam, sandy clay loam, loam, or sandy loam.

Wateree Series

The Wateree series consists of moderately deep, well drained, moderately rapidly permeable soils that formed in material weathered from granite and gneiss. These soils are on narrow ridges, side slopes, and bluffs near streams and the tributaries south of Eden that flow into the Dan River. Slopes range from 6 to 45 percent.

Typical pedon of Wateree fine sandy loam, 6 to 15 percent slopes; about 2.3 miles southwest of Ruffin; 800 feet southeast of the intersection of U.S. Highway 29 and U.S. Highway 29 Business; 800 feet south of U.S. Highway 29 Business, in a peach orchard:

Ap—0 to 6 inches; dark brown (10YR 4/3) fine sandy loam; weak fine granular structure; very friable; common fine and medium roots; about 10 percent gneiss fragments as much as 1 inch in size; strongly acid; clear smooth boundary.

BA—6 to 10 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak fine granular structure; very friable; common fine and medium roots; about 10 percent gneiss fragments as much as 1 inch in size; strongly acid; clear smooth boundary.

Bw—10 to 22 inches; brownish yellow (10YR 6/6) sandy loam; weak medium subangular blocky structure; friable; few medium roots; about 12 percent gneiss fragments as much as 1 inch in size; very strongly acid; clear wavy boundary.

C—22 to 25 inches; yellowish brown (10YR 5/6), partly weathered saprolite that is derived from gneiss and that crushes to sandy loam; massive; firm; few fine roots in fracture planes along fragments; very strongly acid; clear wavy boundary.

Cr—25 to 60 inches; yellowish brown (10YR 5/6), soft gneiss bedrock that crushes to loamy sand.

The thickness of the B horizon ranges from 9 to 25 inches. The depth to soft bedrock ranges from 20 to 40 inches. The soils range from very strongly acid to medium acid.

The A or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. The BA horizon, if it occurs, has hue of 10YR, value of 3 to 6, and chroma of 4 to 8. It is loamy sand, sandy loam, or fine sandy loam. The Bw horizon has hue of 10YR or 7.5YR, value of 5 to 7, and chroma of 4 to 8. It is sandy loam or loamy sand. The C horizon is saprolite derived from partly weathered gneiss and granite bedrock. It crushes to sandy loam or loamy sand. It has hue of 10YR or 7.5YR, value of 4 to 7, and chroma of 4 to 8.

Wehadkee Series

The Wehadkee series consists of deep, poorly drained, moderately permeable soils that formed in alluvium. These soils are in depressions on flood plains. Slopes range from 0 to 2 percent.

Typical pedon of Wehadkee silt loam; about 1 mile west of Stacy on Secondary Road 1931; about 500 feet north of Secondary Road 1931 and Wolf Island Creek:

A—0 to 7 inches; light brownish gray (2.5Y 6/2) silt loam; common medium distinct strong brown (7.5YR 5/8) and yellowish red (5YR 5/8) mottles; weak fine granular structure; very friable; many fine and medium roots; few fine dark concretions; few fine flakes of mica; medium acid; clear smooth boundary.

Bg1—7 to 10 inches; light brownish gray (10YR 6/2) sandy loam; common medium distinct yellowish red (5YR 5/8) and reddish brown (5YR 4/4) mottles; weak fine subangular blocky structure; very friable; common fine and medium roots; few fine flakes of mica; strongly acid; clear smooth boundary.

Bg2—10 to 16 inches; light brownish gray (10YR 6/2) silty clay loam; common medium distinct yellowish red (5YR 4/8), reddish brown (5YR 4/4), and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; common fine roots; common fine flakes of mica; strongly acid; clear smooth boundary.

Bg3—16 to 23 inches; grayish brown (10YR 5/2) silty clay loam; common medium distinct yellowish red (5YR 4/8 and 5/8) and common fine distinct strong

brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; common fine flakes of mica; medium acid; clear wavy boundary.

Bg4—23 to 28 inches; gray (10YR 6/1) loam; common medium distinct yellowish red (5YR 5/8) and reddish brown (5YR 4/4) mottles; weak medium subangular blocky structure; friable; few fine dark concretions; few fine roots; common fine flakes of mica; medium acid; clear wavy boundary.

Bg5—28 to 36 inches; gray (10YR 6/1) clay loam; common medium distinct strong brown (7.5YR 5/8) and common fine distinct yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine roots; common fine flakes of mica; medium acid; clear wavy boundary.

Bg6—36 to 47 inches; gray (10YR 6/1) clay loam; many medium distinct yellowish brown (10YR 5/8) and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; common fine flakes of mica; medium acid; clear wavy boundary.

C—47 to 60 inches; gray (10YR 6/1) clay loam; many medium distinct yellowish brown (10YR 5/8) and strong brown (7.5YR 5/6) mottles; massive; friable; few fine roots; common fine flakes of mica; strongly acid.

The thickness of the Bg horizon ranges from 40 to 55 inches. The soils are very strongly acid to slightly acid. Most horizons have few or common flakes of mica.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2. The Bg horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2, or it is neutral in hue and has value of 4 to 6. It is sandy loam, silt loam, loam, clay loam, or silty clay loam. The C horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2, or it is neutral in hue and has value of 4 to 7. It is commonly clay loam, sandy loam, or loam, but some pedons have thin strata of sand and gravel.

Wickham Series

The Wickham series consists of deep, well drained, moderately permeable soils that formed in old alluvium. These soils are on narrow, slightly elevated stream terraces. Slopes range from 1 to 4 percent.

Typical pedon of Wickham sandy loam, 1 to 4 percent slopes; about 1.2 miles south of Williamsburg on North Carolina Highway 150; about 1 mile east on Secondary Road 2626; about 2,400 feet north of the end of Secondary Road 2626, in a tobacco field along the Haw River:

Ap—0 to 12 inches; dark brown (7.5YR 4/4) sandy loam; weak fine granular structure; very friable; common fine and few medium roots; medium acid; clear wavy boundary.

Bt1—12 to 18 inches; brown (7.5YR 5/4) sandy clay loam; weak medium subangular blocky structure; friable; common fine and few medium roots; few faint clay films on faces of peds; medium acid; clear wavy boundary.

Bt2—18 to 40 inches; yellowish red (5YR 4/6) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; few faint clay films on faces of peds; medium acid; clear wavy boundary.

Bt3—40 to 50 inches; strong brown (7.5YR 5/6) sandy loam; weak medium subangular blocky structure; very friable; few fine roots; few distinct clay films on faces of peds; medium acid; gradual wavy boundary.

C—50 to 60 inches; reddish yellow (7.5YR 6/6) sand; single grained; loose; about 5 percent fine gravel; slightly acid.

The thickness of the Bt horizon ranges from 30 to 50 inches. The depth to bedrock is more than 5 feet. Reaction is strongly acid or medium acid in the A, E, and Bt horizons and ranges from strongly acid to slightly acid in the C horizon.

The A or Ap horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. The E horizon, if it occurs, has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 4. It is sandy loam, fine sandy loam, or loam.

The Bt horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is sandy clay loam, clay loam, sandy loam, or loam.

The C horizon has hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 3 to 8. The alluvial strata range from loam to sand and have few to many pebbles.

Wilkes Series

The Wilkes series consists of shallow, well drained, moderately slowly permeable soils that formed in material weathered from diorite, gabbro schist, and other rocks high in content of ferromagnesian minerals. These soils are on narrow, sloping ridges and steep side slopes. Slopes range from 4 to 45 percent.

Typical pedon of Wilkes sandy loam, 10 to 45 percent slopes; about 1.8 miles northeast of Williamsburg on North Carolina Highway 150; about 1,100 feet southwest of the intersection of North Carolina Highway 150 and Secondary Road 2607, on

North Carolina Highway 150; about 4,000 feet northwest of the highway, in access road cut to Beaver Lodge Estates:

A—0 to 7 inches; brown (10YR 4/3) sandy loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid; clear wavy boundary.

Bt—7 to 15 inches; strong brown (7.5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; firm, sticky and plastic; few faint clay films on faces of peds; few fine roots; few fine feldspar fragments; strongly acid; gradual wavy boundary.

Cr—15 to 60 inches; strong brown (7.5YR 5/6), grayish green (5G 4/2), and black (10YR 2/1), moderately hard hornblende gneiss saprolite that crushes to loam; platy rock structure; firm; few roots and soil material in rock fractures.

The thickness of the B horizon ranges from 6 to 14 inches. The depth to weathered bedrock is less than 20 inches. The depth to hard bedrock is 40 to more than 60 inches. Reaction ranges from strongly acid to slightly acid in the upper horizons and from strongly acid to mildly alkaline in the lower horizons.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 2 to 4. The E horizon, if it occurs, has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 to 4. It is sandy loam or loam. The Bt horizon has hue of 10YR, 7.5YR, or 5YR, value of 4 to 6, and chroma of 4 to 8. It is clay, clay loam, or sandy clay loam. The C horizon, if it occurs, is saprolite derived from basic crystalline rocks. It crushes to loam or sandy loam. The Cr horizon is moderately hard, basic crystalline rock.

Factors of Soil Formation

P. Albert Carpenter III, senior geologist, Geological Survey Section, North Carolina Department of Natural Resources and Community Development, helped prepare this section.

Soils form through processes of the environment that act upon geologic material, such as metamorphic, igneous, and sedimentary rocks and fluvial stream sediments. The combined influence of parent material, climate, living organisms, relief, and time determines the characteristics of a soil. These five factors of soil formation are responsible for the profile development and chemical properties that distinguish different kinds of soil. Over time, climate and living organisms act upon the parent material in association with the topography of an area in forming soils.

General Geology and Soil Parent Materials

Rocks of four main geologic provinces in North Carolina underlie Rockingham County. These provinces are the Sauratown Mountains anticlinorium, the Dan River Triassic basin, the Charlotte belt, and the Carolina slate belt. The northwest corner of the county is in the Sauratown Mountains anticlinorium and includes gently folded, interlayered biotite and hornblende gneisses and schists. Dips are moderate to steep. Small bodies of pegmatite commonly intrude the gneisses and schists. They were once a commercial source of sheet mica. Metamorphic and intrusive rocks of the Charlotte belt underlie the southeastern two-thirds of the county. These rocks are primarily northeast-trending biotite gneisses and schists and felsic gneiss that porphyritic granite has intruded. Mafic and felsic volcanic rocks of the Carolina slate belt are in the extreme southeast corner of the county.

Triassic sedimentary rocks are in a northeast-trending, downfaulted basin that extends from southern Stokes County to Appomattox County, Virginia. This is the Dan River Triassic basin. A line of normal faults forms its boundary on the northwest. The southeastern edge of the basin is an irregular contact between sediments and metamorphic rocks. It has been faulted in places. Within the basin, topography is generally 50 to 300 feet lower than that of the surrounding metamorphic terraines; however, between the towns of Madison and Stoneville, well indurated, interbedded siltstone and sandstone form two prominent northeast-trending ridges with local relief of almost 400 feet.

Narrow, north- and northwest-trending diabase dikes of Triassic age intrude most rock types but are most common in the Dan River basin.

The major soils that formed in material weathered from sedimentary rocks are Ayersville, Leaksville, Mayodan, Spray, and Stoneville soils (fig. 10). The major soils that formed in residuum of igneous rocks are Appling, Helena, Iredell, Mecklenburg, and Vance soils. The major soils that formed in residuum of metamorphic rocks are Cecil, Madison, Pacolet, and Wilkes soils. Where sedimentary rock of the Dan River Triassic basin overlaps the metamorphic rock on the Piedmont Plateau, the parent material makes up a complex pattern in relation to the landscape. In these areas, soils that formed in material weathered from sedimentary rocks of the Dan River Triassic basin are on ridgetops and those that formed in material weathered from metamorphic rocks are on side slopes. In places the weathered rocks are exposed on the landscape.

Many soil properties are related to the characteristics of the parent material. Most soils in Rockingham County have a clayey particle-size control section because the parent material contained a relatively high amount of minerals that weathered to clay. Soils that formed in material weathered from Triassic shale and siltstone, such as Ayersville, Stoneville, and Leaksville soils, are high in content of silt. In contrast, soils that formed in material weathered from granitic rock, such as Vance and Helena soils, are relatively low in content of silt.

Parent material also influenced soil mineralogy. Soils that formed in material weathered from acid, igneous and metamorphic rock, such as Cecil, Pacolet, Appling, and Madison soils, are in the kaolinitic mineralogy class. Kaolinitic clays are dominant in most of the soils south of the Dan River. Soils that formed in material weathered from sedimentary rocks of the Dan River Triassic basin and near basic igneous and metamorphic rock intrusions are in the montmorillonitic mineralogy

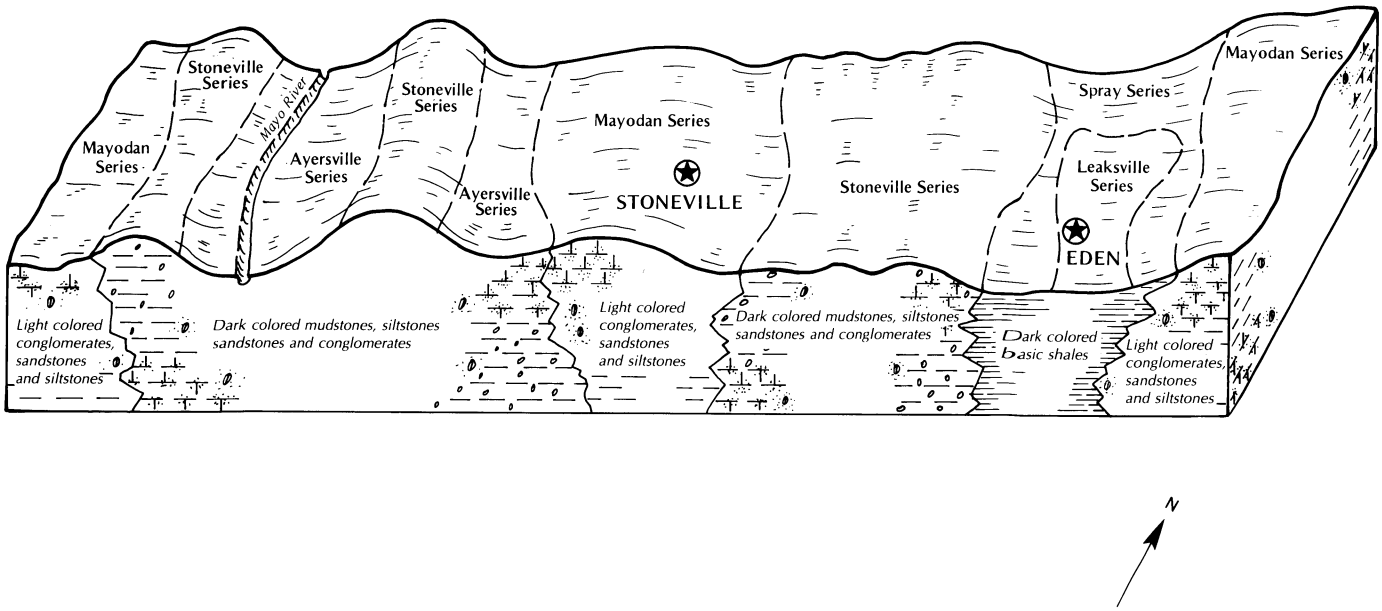


Figure 10.—Relationship of the dominant soils to types of parent material in the Triassic basin area of Rockingham County.

class. Montmorillonitic clays have expanding properties and result in a high or very high shrink-well potential in Iredell and Leaksville soils.

Alluvial soils formed in transported upland soil material. Soils on stream terraces, such as Wickham and Dogue soils, and soils on flood plains, such as Wehadkee soils along Troublesome Creek, formed in material that washed mostly from the acid soils of the Piedmont uplands. The alluvial soils along the Dan, Smith, and Mayo Rivers formed in material that washed from soils formed in material weathered from sedimentary rocks of the Dan River Triassic basin and in material weathered from igneous and metamorphic rocks of the surrounding uplands. Chastain soils formed in alluvium that has a high content of clay. These soils are along wide flood plains near the confluence of the Haw River and Benaja and Troublesome Creeks.

Prominent dikes of Triassic diabase rocks crop out within the Dan River Triassic basin and the adjacent areas. These dikes are long and only about 25 to 150 feet wide. A spot symbol indicates the dikes on the detailed soil maps at the back of this publication. Iredell and Mecklenburg are the major soils within these dike areas. Typically, soil reaction, base saturation, and mineralogy in these soils contrast sharply with those in the adjacent soils.

Climate

The climate of Rockingham County is warm and humid. Summers are long and hot; winters are short and mild. Rainfall is distributed fairly evenly throughout the year.

From November to April, precipitation exceeds evapotranspiration. Rainfall either runs off the surface or soaks into the ground. Percolating water leaches nutrients and other soluble compounds. It also leaches clay and less soluble colloids, but at a slower rate. From May to October, evapotranspiration exceeds precipitation. Summer showers usually wet only the top few inches of the soil. As a result, colloidal clay moves only a short distance. The combined effect of rainfall and evapotranspiration has produced, in most areas of the county, a clay-enriched subsoil below a loamy topsoil.

Heat and moisture favor chemical and biological activity. In a warm, humid climate, plant debris decomposes rapidly and thoroughly. The well drained soils in Rockingham County are relatively low in content of organic matter.

Living Organisms

Of the five soil-forming factors, the role of living organisms in soil formation is probably the least understood. Plants and large and small animals play a very active role in soil formation.

Living organisms transfer soil material from below to above ground. When a tree falls, soil clinging to the roots is pulled to the surface and subsoil material is mixed with surface soil material. Ant piles and crawfish mounds generally contain material from the subsoil. As

animals move and plants grow, they blend soil ingredients into a uniform mixture. Roots break up pockets of sand and clay. Worms cleave some particles and squeeze others. Through mixing, reactants are added, products are removed, and the chemical activity of particle surfaces is recharged.

Living organisms contribute to the chemical environment within the soil profile. Old roots leave channels for air and water. Decaying plants release nutrients and organic acids. Living roots absorb water and nutrients, raise the level of carbon dioxide and lower that of oxygen, and increase acidity. Nutrients are absorbed by deep tree roots before they are leached past the root zone. The nutrients are deposited in leaves on the soil surface. If trees are cleared for agriculture, fertilizer must be added to replace nutrients the trees no longer recycle.

As living organisms affect the chemical environment, they influence soil color. Well drained soils are yellow and red; poorly drained soils are mottled in shades of gray. Yellow and red iron compounds coat the mineral grains, which are colorless. If the soil is saturated and roots and micro-organisms use oxygen faster than it can be replenished, the iron pigments dissolve in the ground water. When the iron stains are washed off, the mineral grains appear gray. This process accounts for the formation of gray mottles at the depth of the seasonal high water table.

Relief

Landscape position has a major effect on soil formation. The major upland landscape positions are convex ridgetops; sloping to steep, convex side slopes; and depressions at the head of and along intermittent drainageways. The landscape is much more dissected along the intermittent drainageways than on the relatively stable ridgetops or the erodible side slopes.

Landscape position determines soil drainage. Soils in concave areas at the head of intermittent drainageways are generally somewhat poorly drained or poorly drained. Soils on convex ridgetops are generally well drained, and in many places soils on steep slopes are excessively drained to well drained.

Soil drainage influences profile development, as is exemplified by the well drained Appling and poorly drained or somewhat poorly drained Leaksville soils. Appling soils typically have a yellowish brown A horizon, which directly overlies a reddish yellow and strong brown, mottled, clay-enriched B horizon. Leaksville soils are grayer throughout than the Appling soils.

Most areas of the county are sloping. Drainageways have entrenched the uplands to the extent that most of the soils are well drained. The soils on eroding side slopes, such as Pacolet and Madison soils, have a subsoil that is thinner than that of the soils on stable ridgetops, such as Cecil and Appling soils.

Time

The length of time that the soil-forming factors act on the parent material determines to a large degree the characteristics of the soil. The majority of soils in Rockingham County have well developed, genetically related horizons. The gently sloping soils on uplands, such as Appling and Cecil soils, have a thick, well developed profile. The soils on flood plains, mainly Chewacla, Congaree, and Wehadkee soils, are younger than the soils on uplands and terraces. They do not have a well developed profile. The degree of profile development of the soils on uplands is similar to that of the soils on terraces, even though the landscapes differ in age. This similarity indicates that soil formation in Rockingham County has reached equilibrium with the environment. The warm, humid climate in the county favors rapid profile development.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Andesite. A fine grained igneous rock with no quartz or orthoclase. It is composed of about 75 percent plagiocase feldspars with the balance being ferromagnesian silicates. Important as lavas, possibly derived by fractional crystallization from basaltic magma.

Anticline. A configuration of folded, stratified rocks in which the rocks dip in two directions away from a crest, as when the principal rafters of a common gable roof dip away from the ridgepole. The reverse of a syncline. The "ridgepole" or crest is called the axis.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Basalt. A fine grained igneous rock dominated by dark minerals, consisting of over 50 percent plagioclase feldspars with the balance being ferromagnesian silicates. Basalts and andesites represent about 98 percent of all extrusive rocks.

Basic rock. An igneous rock composed dominantly of dark minerals. The minerals of this rock are comparatively low in content of silica and rich in bases, such as the amphiboles, the pyroxenes, biotite, or olivine.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Biotite. A common rock-forming mineral consisting primarily of ferromagnesian silicate minerals. Color ranges from dark brown to green in thin sections. Biotite is commonly referred to as "black mica" because of the natural black color.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a fragment.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

CMAI (cumulative mean annual increment). The age or rotation at which growing stock of a forest produces the greatest annual growth (for that time period). It is the age at which periodic annual growth and mean annual growth are equal.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conglomerate. A detrital sedimentary rock made up of rounded waterworn fragments of rock or pebbles cemented by another mineral substance.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Dbh (diameter at breast height). The diameter of a tree at 4 feet above the ground level on the uphill side.

Depth class. Refers to the depth to a root-restricting layer. Unless otherwise stated, this layer is understood to be consolidated bedrock. The depth classes in this survey are:

Very shallow	less than 10 inches
Shallow	10 to 20 inches
Moderately deep	20 to 40 inches
Deep	40 to 60 inches
Very deep	more than 60 inches

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diabase. A rock of basaltic composition consisting primarily of labradorite and pyroxene and characterized by ophitic texture.

Dike. A long, narrow cross cutting mass of igneous rock that extends to or crops out on the land surface.

Diorite. A coarse grained igneous rock with the composition of andesite (no quartz or orthoclase). It is composed of about 75 percent plagioclase feldspars with the balance being ferromagnesian silicates.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops

unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Engineering test data. Data from laboratory tests and mechanical analysis of selected soils in the county.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic).—Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated).—Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, such as fire, that exposes the surface.

Erosion classes. Classes based on estimates of past erosion. They are as follows:

Class 1.—Soils that have lost some of the original A horizon but on the average less than 25 percent of the original A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick). Throughout most of the area, the thickness of the surface layer is within the normal range of variability of the uneroded soil. Class 1 erosion typically is not designated in the name of the map unit or in the map symbol.

Class 2.—Soils that have lost an average of 25 to 75 percent of the original A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick). Throughout most cultivated areas of class 2 erosion, the surface layer consists of a mixture of the original A horizon and material from below. Some areas may have intricate patterns ranging from uneroded spots to spots where all of the original A horizon has been removed.

Class 3.—Soils that have lost an average of 75 percent or more of the original A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick). In most cultivated areas of class 3 erosion, material below the original A horizon is exposed. The plow layer consists entirely or largely of material that was below the original A horizon.

Class 4.—Soils that have lost all of the original A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick) plus some or all of the deeper horizons throughout most of the area. The original soil can be identified only in spots. Some areas may be smooth, but most have an intricate pattern of gullies.

Erosion hazard. Terms describing the potential for future erosion, inherent in the soil itself, in inadequately protected areas. The following definitions are based on estimated annual soil loss in tons per acre (values determined by the Universal Soil Loss Equation assuming bare soil conditions and using rainfall and climate factors for North Carolina):

0 tons per acre	none
Less than 1 ton per acre	slight
1 to 5 tons per acre	moderate
5 to 10 tons per acre	severe
More than 10 tons per acre	very severe

Excess lime (in tables). Excess carbonates in the soil restrict the growth of some plants.

Fault. A surface of rock rupture along which there has been differential movement.

Felsite (felsic). A general term for light colored, fine grained igneous rocks.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Flooding. The temporary covering of the soil surface by flowing water from any source, such as overflowing streams, runoff from adjacent or surrounding slopes, and inflow from high tides.

The frequency of flooding generally is expressed as none, rare, occasional, or frequent. *None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). The duration of flooding is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month).

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Gneiss. A coarse grained metamorphic rock in which bands rich in granular minerals alternate with bands in which schistose minerals predominate. It is commonly formed by the metamorphism of granite.

Granite. A coarse grained igneous rock dominated by light colored minerals, consisting of about 50 percent orthoclase and 25 percent quartz with the balance being plagioclase feldspars and ferromagnesian silicates. Granites and granodiorites comprise 95 percent of all intrusive rocks.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Hornblende. A rock-forming ferromagnesian silicate mineral of the amphibole group.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting

runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Igneous rock. Rock formed by solidification of molten rock, generally crystalline in nature.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Mafic rock. A dark rock composed predominantly of magnesium silicates. It contains little quartz, feldspar, or muscovite mica.

Mean annual increment. The average yearly volume of a stand of trees from the year of origin to the age under consideration.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Micas. A group of silicate minerals characterized by sheet or scale cleavage. Biotite is the ferromagnesian black mica. Muscovite is the potassic white mica.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Mudstone. Fine grained, detrital sedimentary rock made up of silt- and clay-sized particles. Distinguished from shale by lack of fissility.

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Muscovite. A nonferromagnesian rock-forming silicate mineral with its tetrahedra arranged in sheets. Commonly called "white mica" and sometimes called potassic mica.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

No-till planting. A method of planting crops in which there is virtually no seedbed preparation. A thin slice of the soil is opened, and the seed is planted at the desired depth.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Pegmatite. A small pluton of exceptionally coarse texture, commonly formed at the margin of a batholith characterized by graphic structure. Nearly 90 percent of all pegmatites are simple pegmatites of quartz, orthoclase, and unimportant percentages of micas.

Permeability. The quality of the soil that enables water to move through the profile. Permeability is measured as the number of inches per hour that water moves through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch

Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phenocryst. A crystal significantly larger than the crystals of surrounding minerals.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Subsurface tunnels or pipelike cavities are formed by water moving through the soil.

Pitting (in tables). Pits are caused by melting ground ice. They form on the soil after plant cover is removed.

Pluton. A body of igneous rock that is formed beneath the surface of the earth by consolidation from magma. Sometimes extended to include bodies formed beneath the surface of the earth by the metasomatic replacement of older rock.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Porphyritic. A textural term for igneous rocks in which larger crystals, called phenocrysts, are set in a finer groundmass. The groundmass may be crystalline or glassy, or both.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Reaction, soil. A measure of the acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Reforestation. The process in which tree seedlings are planted or become naturally established in an area that was once forested.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rippable. Rippable bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). There is a shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Runoff class (surface). Refers to the rate at which water flows away from the soil over the surface without infiltrating. Six classes of rate of runoff are recognized:

Ponded.—Little of the precipitation and water that runs onto the soil escapes as runoff, and free water stands on the surface for significant periods. The amount of water that is removed from ponded areas by movement through the soil, by plants, or by evaporation is usually greater than the total rainfall. Ponding normally occurs on level and nearly level soils in depressions. The water depth may fluctuate greatly.

Very slow.—Surface water flows away slowly, and free water stands on the surface for long periods or immediately enters the soil. Most of the water passes through the soil, is used by plants, or evaporates. The soils are commonly level or nearly level or are very porous.

Slow.—Surface water flows away so slowly that free water stands on the surface for moderate periods or enters the soil rapidly. Most of the water passes through the soil, is used by plants, or evaporates. The soils are nearly level or very gently sloping, or they are steeper but absorb precipitation very rapidly.

Medium.—Surface water flows away so rapidly that free water stands on the surface for only short periods. Part of the precipitation enters the soil and is used by plants, is lost by evaporation, or moves into underground channels. The soils are nearly level or gently sloping and absorb precipitation at a moderate rate, or they are steeper but absorb water rapidly.

Rapid.—Surface water flows away so rapidly that the period of concentration is brief and free water

does not stand on the surface. Only a small part of the water enters the soil. The soils are mainly moderately steep or steep and have moderate or slow rates of absorption.

Very rapid.—Surface water flows away so rapidly that the period of concentration is very brief and free water does not stand on the surface. Only a small part of the water enters the soil. The soils are mainly steep or very steep and absorb precipitation slowly.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Saprolite (soil science). Unconsolidated, residual material underlying the soil and grading to hard bedrock below.

Schist. A metamorphic rock dominated by fibrous or platy minerals. It has schistose cleavage and is a product of regional metamorphism.

Seasonal high water table. The highest level of a saturated zone (the apparent or perched water table) over a continuous period of more than 2 weeks in most years, but not a permanent water table.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slate. A fine grained metamorphic rock with well developed slaty cleavage. Formed by the low-grade regional metamorphism of shale.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Stand density. The degree to which an area is covered with living trees. It is usually expressed in units of basal areas per acre, number of trees per acre, or the percentage of ground covered by the tree canopy as viewed from above.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

Suitability ratings. Ratings for the degree of suitability of soils for pasture, crops, woodland, and engineering uses. The ratings and the general criteria used for their selection are as follows:

Well suited.—The intended use may be initiated and maintained by using only the standard materials and methods typically required for that use. Good results can be expected.

Moderately suited.—The limitations affecting the intended use make special planning, design, or maintenance necessary.

Poorly suited.—The intended use is difficult or costly to initiate and maintain because of soil properties, such as steep slopes, a severe hazard of erosion, a high water table, low fertility, or a hazard of flooding. Major soil reclamation, special design, or intensive management practices are needed.

Very poorly suited.—The intended use is very difficult or costly to initiate and maintain, and thus it generally should not be undertaken.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed on the contour or at a slight angle to the contour across sloping soils. The terrace intercepts surface runoff, so that water soaks into the soil or flows slowly to a prepared outlet.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). An otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Underlying material. Technically the C horizon; the part of the soil below the biologically altered A and B horizons.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Weathering. All physical and chemical changes produced by atmospheric agents in rocks or other deposits at or near the earth's surface. These changes result in disintegration and decomposition of the material.

Wetness. A general term applied to soils that hold water at or near the surface long enough to be a common management problem.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1962-77 at Reidsville, North Carolina)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	46.4	26.6	36.5	72	3	22	3.11	2.15	3.98	7	6.6
February----	49.3	28.1	38.8	73	7	7	3.08	1.68	4.21	6	2.9
March-------	59.0	36.6	47.8	81	18	80	3.91	2.03	3.43	7	3.0
April-------	69.1	45.5	57.3	87	27	227	2.49	1.49	3.38	6	.0
May---------	76.5	54.5	65.5	91	35	481	4.10	2.42	5.59	8	.0
June--------	82.3	61.6	72.0	94	47	660	3.95	1.96	5.58	6	.0
July--------	86.1	65.2	75.7	97	54	797	4.24	2.12	5.97	7	.0
August------	85.1	64.1	74.6	95	52	763	3.36	1.89	4.56	6	.0
September---	79.6	57.4	68.5	93	41	555	3.60	1.51	5.28	5	.0
October-----	69.4	46.2	57.8	85	27	266	3.67	1.04	5.79	5	.0
November----	59.4	37.9	48.7	80	17	67	2.80	1.43	3.91	6	.1
December----	49.2	29.9	39.6	71	9	19	3.35	1.35	4.96	6	1.4
Yearly:											
Average---	67.6	46.1	56.9	---	---	---	---	---	---	---	---
Extreme---	---	---	---	98	1	---	---	---	---	---	---
Total-----	---	---	---	---	---	3,944	41.66	35.08	47.29	75	14.0

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1962-77 at Reidsville, North Carolina)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 12	Apr. 11	Apr. 22
2 years in 10 later than--	Mar. 25	Apr. 5	Apr. 17
5 years in 10 later than--	Mar. 8	Mar. 24	Apr. 4
First freezing temperature in fall:			
1 year in 10 earlier than--	Nov. 4	Oct. 20	Oct. 14
2 years in 10 earlier than--	Nov. 10	Oct. 26	Oct. 19
5 years in 10 earlier than--	Nov. 20	Nov. 6	Oct. 28

TABLE 3.--GROWING SEASON

(Recorded in the period 1962-77 at Reidsville, North Carolina)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	220	201	183
8 years in 10	238	209	189
5 years in 10	256	224	203
2 years in 10	274	242	216
1 year in 10	284	251	223

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
ApB	Appling sandy loam, 2 to 8 percent slopes	12,148	3.3
ApD	Appling sandy loam, 8 to 15 percent slopes	3,761	1.0
AyC	Ayersville gravelly loam, 4 to 15 percent slopes	1,294	0.4
AyF	Ayersville gravelly loam, 15 to 45 percent slopes	1,161	0.3
CcB	Cecil sandy loam, 2 to 8 percent slopes	3,354	0.9
CdB2	Cecil sandy clay loam, 2 to 8 percent slopes, eroded	80,028	21.8
CeC	Cecil-Urban land complex, 2 to 10 percent slopes	5,038	1.4
Ch	Chastain silty clay loam	1,041	0.3
Ck	Chewacla loam	12,963	3.5
Co	Congaree loam	6,216	1.7
CrB	Creedmoor fine sandy loam, 1 to 4 percent slopes	717	0.2
DoB	Dogue loam, 0 to 4 percent slopes	972	0.3
HeB	Helena sandy loam, 2 to 8 percent slopes	921	0.3
HwB	Hiwassee loam, 2 to 8 percent slopes	828	0.2
HwD	Hiwassee loam, 8 to 15 percent slopes	156	*
IrB	Iredell fine sandy loam, 2 to 8 percent slopes	1,127	0.3
IrD	Iredell fine sandy loam, 8 to 15 percent slopes	916	0.3
LeB	Leaksville silt loam, 0 to 4 percent slopes	1,901	0.5
LkB	Leaksville-Urban land complex, 0 to 4 percent slopes	175	*
MaD	Madison sandy loam, 8 to 15 percent slopes	6,128	1.7
MaE	Madison sandy loam, 15 to 35 percent slopes	16,241	4.4
MbB2	Madison sandy clay loam, 2 to 8 percent slopes, eroded	5,445	1.5
MbD2	Madison sandy clay loam, 8 to 15 percent slopes, eroded	7,776	2.1
MbE2	Madison sandy clay loam, 15 to 25 percent slopes, eroded	1,048	0.3
McC2	Madison-Udorthents complex, 2 to 15 percent slopes, gullied	253	0.1
MdB	Mayodan sandy loam, 2 to 8 percent slopes	9,320	2.5
MdD	Mayodan sandy loam, 8 to 15 percent slopes	5,747	1.6
MdE	Mayodan sandy loam, 15 to 25 percent slopes	3,065	0.8
MeB2	Mayodan sandy clay loam, 2 to 8 percent slopes, eroded	6,564	1.8
MeD2	Mayodan sandy clay loam, 8 to 15 percent slopes, eroded	3,394	0.9
MeE2	Mayodan sandy clay loam, 15 to 25 percent slopes, eroded	1,493	0.4
MfC	Mayodan-Urban land complex, 2 to 10 percent slopes	4,093	1.1
MkB2	Mecklenburg sandy clay loam, 2 to 8 percent slopes, eroded	939	0.3
PaD	Pacolet sandy loam, 8 to 15 percent slopes	6,196	1.7
PaE	Pacolet sandy loam, 15 to 25 percent slopes	10,319	2.8
PaF	Pacolet sandy loam, 25 to 40 percent slopes	2,116	0.6
PcD2	Pacolet sandy clay loam, 8 to 15 percent slopes, eroded	47,383	12.9
PcE2	Pacolet sandy clay loam, 15 to 25 percent slopes, eroded	21,684	5.9
PnC	Pinkston fine sandy loam, 6 to 15 percent slopes	299	0.1
PnF	Pinkston fine sandy loam, 15 to 45 percent slopes	1,504	0.4
Pt	Pits, clay	403	0.1
Qu	Pits, quarries	80	*
RnB	Rion sandy loam, 2 to 8 percent slopes	5,310	1.5
RnD	Rion sandy loam, 8 to 15 percent slopes	5,710	1.6
RnE	Rion sandy loam, 15 to 30 percent slopes	6,403	1.7
RoC	Rion-Urban land complex, 2 to 10 percent slopes	346	0.1
SeB	Sedgefield sandy loam, 2 to 8 percent slopes	814	0.2
SpB	Spray loam, 0 to 5 percent slopes	1,174	0.3
SuB	Spray-Urban land complex, 0 to 5 percent slopes	216	0.1
SvB	Stoneville loam, 2 to 8 percent slopes	5,701	1.6
SvD	Stoneville loam, 8 to 15 percent slopes	4,304	1.2
SvE	Stoneville loam, 15 to 25 percent slopes	2,227	0.6
SwC	Stoneville-Urban land complex, 2 to 10 percent slopes	1,910	0.5
Ud	Udorthents, loamy	1,075	0.3
Ur	Urban land	1,265	0.3
VaB	Vance sandy loam, 2 to 8 percent slopes	4,093	1.1
VaD	Vance sandy loam, 8 to 15 percent slopes	1,958	0.5
WaD	Wateree fine sandy loam, 6 to 15 percent slopes	697	0.2
WaF	Wateree fine sandy loam, 15 to 45 percent slopes	1,262	0.3
We	Wehadkee silt loam	3,872	1.1
WhB	Wickham sandy loam, 1 to 4 percent slopes	939	0.3

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
WkC	Wilkes sandy loam, 4 to 10 percent slopes	7,544	2.1
WkF	Wilkes sandy loam, 10 to 45 percent slopes	10,902	3.0
	Water	2,458	0.7
	Total	366,387	100.0

* Less than 0.1 percent.

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil. Tobacco yields are for irrigated (I) and for nonirrigated (N) soils)

Soil name and map symbol	Land capability	Tobacco		Corn	Soybeans	Wheat	Grass-legume hay	Pasture
		I	N					
		Lbs	Lbs	Bu	Bu	Bu	Tons	AUM*
ApB---------- Appling	IIe	2,800	2,200	85	30	40	3.9	6.5
ApD---------- Appling	IVe	2,600	2,000	75	25	35	3.6	6.0
AyC---------- Ayersville	IVe	---	---	55	18	---	2.1	3.5
AyF---------- Ayersville	VIIe	---	---	---	---	---	---	---
CcB---------- Cecil	IIe	3,200	2,400	90	35	45	4.2	7.0
CdB2---------- Cecil	IIIe	2,900	2,400	85	30	40	3.3	5.5
CeC:								
Cecil.								
Urban land.								
Ch---------- Chastain	VIw	---	---	---	---	---	---	---
Ck---------- Chewacla	IVw	---	---	80	30	30	4.5	7.5
Co---------- Congaree	IIIw	2,600	2,400	140	40	40	4.8	8.0
CrB---------- Creedmoor	IIe	---	2,200	75	22	28	3.0	5.0
DoB---------- Dogue	IIe	---	---	105	35	50	3.0	5.0
HeB---------- Helena	IIe	2,600	2,100	80	30	50	3.9	6.5
HwB---------- Hiwassee	IIe	---	---	95	35	60	4.2	7.0
HwD---------- Hiwassee	IVe	---	---	85	30	50	3.6	6.0
IrB---------- Iredell	IIe	---	---	75	25	25	3.3	5.5
IrD---------- Iredell	VIe	---	---	---	---	---	2.7	4.5
LeB---------- Leaksville	IIIw	---	---	65	30	40	3.5	6.0

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Tobacco I	Tobacco N	Corn	Soybeans	Wheat	Grass-legume hay	Pasture
		Lbs	Lbs	Bu	Bu	Bu	Tons	AUM*
LkB:								
Leaksville.								
Urban land.								
MaD---------- Madison	IVe	2,100	1,800	75	25	35	3.0	5.0
MaE---------- Madison	VIIe	---	---	---	---	---	2.7	4.5
MbB2---------- Madison	IIIe	2,300	1,800	75	25	30	3.3	5.5
MbD2---------- Madison	VIe	2,100	1,800	65	20	25	3.0	5.0
MbE2---------- Madison	VIIe	---	---	---	---	---	2.7	4.5
McC2:								
Madison--------	VIIe	---	---	---	---	---	---	---
Udorthents.								
MdB---------- Mayodan	IIe	2,600	2,100	85	30	30	3.6	6.0
MdD---------- Mayodan	IVe	2,200	1,900	70	20	25	3.3	5.5
MdE---------- Mayodan	VIe	---	---	---	---	---	2.7	4.5
MeB2---------- Mayodan	IIIe	2,500	2,000	80	28	25	3.6	6.0
MeD2---------- Mayodan	VIe	2,100	1,800	65	20	20	3.0	5.0
MeE2---------- Mayodan	VIIe	---	---	---	---	---	2.7	4.5
MfC:								
Mayodan.								
Urban land.								
MkB2---------- Mecklenburg	IIIe	---	---	75	25	30	3.0	5.0
PaD---------- Pacolet	IVe	2,300	1,800	75	25	35	2.4	4.0
PaE---------- Pacolet	VIe	---	---	---	---	---	2.1	3.5
PaF---------- Pacolet	VIIe	---	---	---	---	---	---	---

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Tobacco		Corn	Soybeans	Wheat	Grass-legume hay	Pasture
		I	N					
		Lbs	Lbs	Bu	Bu	Bu	Tons	AUM*
PcD2---------- Pacolet	VIe	2,300	1,800	70	22	30	2.4	4.0
PcE2---------- Pacolet	VIIe	---	---	---	---	---	2.1	3.5
PnC---------- Pinkston	IVe	---	---	60	20	30	2.7	4.5
PnF---------- Pinkston	VIIe	---	---	---	---	---	---	---
Pt, Qu. Pits								
RnB---------- Rion	IIe	2,800	2,200	80	35	40	3.3	5.5
RnD---------- Rion	IVe	2,600	2,000	70	25	30	2.7	4.5
RnE---------- Rion	VIe	---	---	---	---	---	2.1	3.5
RoC:								
Rion.								
Urban land.								
SeB---------- Sedgefield	IIe	2,600	2,100	85	40	50	3.6	6.0
SpB---------- Spray	IIe	---	---	60	22	25	2.7	4.5
SuB:								
Spray.								
Urban land.								
SvB---------- Stoneville	IIe	---	---	70	25	20	3.3	5.5
SvD---------- Stoneville	IVe	---	---	60	20	15	3.0	5.0
SvE---------- Stoneville	VIe	---	---	---	---	---	2.7	4.5
SwC:								
Stoneville.								
Urban land.								
Ud. Udorthents								
Ur. Urban land								

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Tobacco		Corn	Soybeans	Wheat	Grass-legume hay	Pasture
		I	N					
		Lbs	Lbs	Bu	Bu	Bu	Tons	AUM*
VaB---------- Vance	IIIe	2,800	2,200	80	35	40	3.6	6.0
VaD---------- Vance	VIe	2,600	2,000	70	25	35	3.0	5.0
WaD---------- Wateree	VIe	2,300	1,800	65	25	35	2.7	4.5
WaF---------- Wateree	VIIe	---	---	---	---	---	---	---
We---------- Wehadkee	IVw**	---	---	100	35	---	3.9	6.5
	VIw***	---	---	---	---	---	3.9	6.5
WhB---------- Wickham	IIe	3,300	2,600	115	45	60	4.8	8.0
WkC---------- Wilkes	IVe	2,400	1,700	65	20	25	3.0	5.0
WkF---------- Wilkes	VIIe	---	---	---	---	---	---	---

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** Drained.

*** Undrained.

TABLE 6.--CAPABILITY CLASSES AND SUBCLASSES

(Miscellaneous areas are excluded. Absence of an entry indicates no acreage)

Class	Total acreage	Major management concerns (Subclass)			
		Erosion (e)	Wetness (w)	Soil problem (s)	Climate (c)
		Acres	Acres	Acres	Acres
I	---	---	---	---	---
II	43,175	43,175	---	---	---
III	103,859	95,742	8,117	---	---
IV	53,902	41,139	12,763	---	---
V	---	---	---	---	---
VI	88,599	83,686	4,913	---	---
VII	57,664	57,664	---	---	---
VIII	---	---	---	---	---

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Potential productivity: Common trees	Site index	Volume*	Trees to plant
ApB, ApD Appling	8A	Slight	Slight	Slight	Loblolly pine**	81	112	Loblolly pine, yellow poplar, hardwoods***.
					Shortleaf pine	65	100	
					Southern red oak	76	58	
					Virginia pine	74	114	
					White oak	71	53	
					Yellow poplar	90	90	
					Sweetgum	---	---	
					Hickory	---	---	
					Black oak	---	---	
AyC Ayersville	6A	Slight	Slight	Moderate	Shortleaf pine	60	88	Loblolly pine.
					Virginia pine	---	---	
					Southern red oak	---	---	
					Black oak	---	---	
					Post oak	---	---	
					Sweetgum	---	---	
					Hickory	---	---	
					Maple	---	---	
AyF Ayersville	6R	Moderate	Moderate	Moderate	Shortleaf pine	60	88	Loblolly pine.
					Virginia pine	---	---	
					Southern red oak	---	---	
					Black oak	---	---	
					Post oak	---	---	
					Sweetgum	---	---	
					Hickory	---	---	
					Maple	---	---	
CcB Cecil	8A	Slight	Slight	Slight	Loblolly pine**	80	110	Loblolly pine, yellow poplar, hardwoods***.
					Shortleaf pine	69	108	
					Virginia pine	73	113	
					Black oak	66	48	
					Southern red oak	---	---	
					Sweetgum	---	---	
					Hickory	---	---	
					White oak	---	---	
CdB2 Cecil	7C	Moderate	Moderate	Moderate	Loblolly pine**	72	96	Loblolly pine.
					Shortleaf pine	66	102	
					Virginia pine	65	100	
					Black oak	---	---	
					Southern red oak	---	---	
					Sweetgum	---	---	
					Hickory	---	---	
					White oak	---	---	
Ch Chastain	8W	Slight	Severe	Severe	Sweetgum	95	122	Sweetgum.
					Willow oak	---	---	
					Ash	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Potential productivity: Common trees	Site index	Volume*	Trees to plant
Ck---------- Chewacla	10W	Slight	Moderate	Slight	Loblolly pine**------	96	145	Loblolly pine, hardwoods***.
					Yellow poplar--------	100	107	
					American sycamore----	---	---	
					Sweetgum----------	97	128	
					Southern red oak-----	---	---	
					Virginia pine--------	---	---	
					Shortleaf pine-------	---	---	
					Black oak----------	---	---	
					White oak----------	---	---	
					Hickory----------	---	---	
Co---------- Congaree	9A	Slight	Slight	Slight	Loblolly pine**------	90	131	Loblolly pine, hardwoods***.
					Sweetgum----------	100	138	
					Yellow poplar--------	107	119	
					American sycamore----	89	---	
					Black walnut---------	100	---	
					Willow oak----------	95	---	
					River birch----------	---	---	
					American beech-------	---	---	
					Virginia pine--------	---	---	
					Shortleaf pine-------	---	---	
					Persimmon----------	---	---	
					Black oak----------	---	---	
					Post oak----------	---	---	
					Southern red oak-----	---	---	
					Crimson oak----------	---	---	
CrB---------- Creedmoor	8W	Slight	Moderate	Slight	Loblolly pine**------	84	118	Loblolly pine, shortleaf pine.
					Shortleaf pine-------	55	78	
					Yellow poplar--------	---	---	
					Southern red oak-----	---	---	
					Virginia pine--------	---	---	
					White oak----------	---	---	
					Black oak----------	---	---	
					Post oak----------	---	---	
DoB---------- Dogue	9W	Slight	Moderate	Slight	Loblolly pine**------	90	131	Loblolly pine.
					Southern red oak-----	80	62	
					Sweetgum----------	90	106	
					Yellow poplar--------	93	95	
					White oak----------	80	62	
HeB---------- Helena	8W	Slight	Moderate	Slight	Loblolly pine**------	80	110	Loblolly pine, shortleaf pine.
					Shortleaf pine-------	63	95	
					White oak----------	64	47	
					Yellow poplar--------	87	84	
					Sweetgum----------	---	---	
					Northern red oak-----	---	---	
					Southern red oak-----	---	---	
					Black oak----------	---	---	
					Hickory----------	---	---	
					Post oak----------	---	---	
					Crimson oak----------	---	---	
					Maple----------	---	---	
					Blackjack oak--------	---	---	
					Willow oak----------	---	---	
					Virginia pine--------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Potential productivity: Common trees	Site index	Volume*	Trees to plant
HwB, HwD Hiwassee	7A	Slight	Slight	Slight	Loblolly pine**	75	101	Loblolly pine, shortleaf pine.
					Northern red oak	70	52	
					Shortleaf pine	70	110	
					White oak	70	52	
					Yellow poplar	85	81	
					Maple	---	---	
					Ash	---	---	
					Beech	---	---	
					Virginia pine	---	---	
					Black oak	---	---	
					Post oak	---	---	
					Southern red oak	---	---	
					Crimson oak	---	---	
					Sweetgum	---	---	
					Hickory	---	---	
IrB, IrD Iredell	6C	Slight	Moderate	Moderate	Loblolly pine**	67	88	Loblolly pine, shortleaf pine.
					Shortleaf pine	58	84	
					Blackjack oak	---	---	
					Willow oak	47	32	
					Virginia pine	---	---	
					Eastern redcedar	---	---	
LeB Leaksville	6C	Slight	Moderate	Moderate	Shortleaf pine	60	92	Shortleaf pine.
					Southern red oak	60	43	
					Willow oak	---	---	
					Shagbark hickory	---	---	
					Eastern red cedar	---	---	
MaD Madison	7A	Slight	Slight	Slight	Loblolly pine**	73	98	Loblolly pine, shortleaf pine.
					Shortleaf pine	66	101	
					Southern red oak	81	82	
					Yellow poplar	96	100	
					Sweetgum	---	---	
					White oak	---	---	
					Virginia pine	---	---	
MaE Madison	7R	Moderate	Moderate	Slight	Loblolly pine**	73	98	Loblolly pine, shortleaf pine.
					Shortleaf pine	66	101	
					Southern red oak	81	82	
					Yellow poplar	96	100	
					Sweetgum	---	---	
					White oak	---	---	
					Virginia pine	---	---	
MbB2, MbD2 Madison	7C	Moderate	Moderate	Moderate	Loblolly pine**	62	79	Loblolly pine, shortleaf pine.
					Shortleaf pine	---	---	
					Virginia pine	---	---	
					Hickory	---	---	
					Northern red oak	---	---	
MbE2 Madison	7R	Moderate	Moderate	Slight	Loblolly pine**	62	79	Loblolly pine, shortleaf pine.
					Shortleaf pine	---	---	
					Virginia pine	---	---	
					Hickory	---	---	
					Northern red oak	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Potential productivity: Common trees	Site index	Volume*	Trees to plant
MdB, MdD Mayodan	8A	Slight	Slight	Slight	Loblolly pine**	82	114	Loblolly pine.
					Shortleaf pine	---	---	
					Yellow poplar	---	---	
					Sweetgum	---	---	
					Southern red oak	---	---	
					Black oak	---	---	
					White oak	---	---	
					Hickory	---	---	
					Virginia pine	---	---	
MdE Mayodan	8R	Moderate	Moderate	Moderate	Loblolly pine**	82	114	Loblolly pine.
					Shortleaf pine	---	---	
					Yellow poplar	---	---	
					Sweetgum	---	---	
					Southern red oak	---	---	
					Black oak	---	---	
					White oak	---	---	
					Hickory	---	---	
					Virginia pine	---	---	
MeB2, MeD2 Mayodan	8C	Slight	Slight	Slight	Loblolly pine**	68	90	Loblolly pine, shortleaf pine.
					Shortleaf pine	---	---	
					Yellow poplar	---	---	
					Sweetgum	---	---	
					Southern red oak	---	---	
					Black oak	---	---	
					White oak	---	---	
					Hickory	---	---	
					Virginia pine	---	---	
MeE2 Mayodan	8R	Moderate	Moderate	Moderate	Loblolly pine**	68	90	Loblolly pine, shortleaf pine.
					Shortleaf pine	---	---	
					Yellow poplar	---	---	
					Sweetgum	---	---	
					Southern red oak	---	---	
					Black oak	---	---	
					White oak	---	---	
					Hickory	---	---	
					Virginia pine	---	---	
MkB2 Mecklenburg	6C	Slight	Moderate	Slight	Loblolly pine**	66	86	Loblolly pine, shortleaf pine.
					Shortleaf pine	64	97	
					Southern red oak	---	---	
					Eastern redcedar	---	---	
					Virginia pine	---	---	
PaD Pacolet	8A	Slight	Slight	Slight	Loblolly pine**	78	107	Loblolly pine, shortleaf pine.
					Shortleaf pine	70	110	
					Yellow poplar	90	90	
					Virginia pine	---	---	
					Sweetgum	---	---	
					Southern red oak	---	---	
					White oak	---	---	
					Maple	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Potential productivity: Common trees	Site index	Volume*	Trees to plant
PaE, PaF Pacolet	8R	Moderate	Moderate	Slight	Loblolly pine**	78	107	Loblolly pine, shortleaf pine.
					Shortleaf pine	70	110	
					Yellow poplar	90	90	
					Virginia pine	---	---	
					Sweetgum	---	---	
					Southern red oak	---	---	
					White oak	---	---	
					Maple	---	---	
PcD2 Pacolet	6C	Moderate	Moderate	Moderate	Loblolly pine**	70	93	Loblolly pine, shortleaf pine.
					Shortleaf pine	60	88	
					Yellow poplar	80	71	
					Virginia pine	---	---	
					Sweetgum	---	---	
					Southern red oak	---	---	
					White oak	---	---	
					Maple	---	---	
PcE2 Pacolet	6C	Severe	Severe	Severe	Loblolly pine**	70	93	Loblolly pine, shortleaf pine.
					Shortleaf pine	60	88	
					Yellow poplar	80	71	
					Virginia pine	---	---	
					Sweetgum	---	---	
					Southern red oak	---	---	
					White oak	---	---	
					Maple	---	---	
PnC Pinkston	3D	Slight	Slight	Moderate	Southern red oak	60	43	Loblolly pine, shortleaf pine.
					Virginia pine	60	91	
					White oak	---	---	
					Black oak	---	---	
					Post oak	---	---	
					Hickory	---	---	
					Maple	---	---	
					Shortleaf pine	---	---	
PnF Pinkston	3D	Moderate	Moderate	Moderate	Southern red oak	60	43	Loblolly pine, shortleaf pine.
					Virginia pine	60	91	
					White oak	---	---	
					Black oak	---	---	
					Post oak	---	---	
					Hickory	---	---	
					Maple	---	---	
					Shortleaf pine	---	---	
RnB, RnD Rion	8A	Slight	Slight	Slight	Loblolly pine**	80	110	Loblolly pine, shortleaf pine.
					Shortleaf pine	70	110	
					Southern red oak	80	62	
					Sweetgum	80	79	
					White oak	70	52	
					Yellow poplar	90	90	
					Virginia pine	---	---	
					Black oak	---	---	
					Hickory	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Potential productivity: Common trees	Site index	Volume*	Trees to plant
RnE---------- Rion	8R	Moderate	Moderate	Moderate	Loblolly pine**------	80	110	Loblolly pine, shortleaf pine.
					Shortleaf pine-------	70	110	
					Southern red oak-----	80	62	
					Sweetgum----------	80	79	
					White oak----------	70	52	
					Yellow poplar--------	90	90	
					Virginia pine--------	---	---	
					Black oak----------	---	---	
					Hickory----------	---	---	
SeB---------- Sedgefield	8W	Slight	Moderate	Slight	Loblolly pine**------	80	110	Loblolly pine.
					Shortleaf pine-------	---	---	
					Virginia pine--------	---	---	
					Southern red oak-----	---	---	
					Sweetgum----------	---	---	
					Yellow poplar--------	---	---	
					White oak----------	---	---	
					Black oak----------	---	---	
					Post oak----------	---	---	
					Crimson oak----------	---	---	
					Hickory----------	---	---	
					Maple----------	---	---	
					Blackjack oak--------	---	---	
					Willow oak----------	---	---	
					Eastern redcedar-----	---	---	
					Chestnut oak---------	---	---	
SpB---------- Spray	6A	Slight	Slight	Slight	Virginia pine--------	60	91	Virginia pine.
					Southern red oak-----	---	---	
					White oak----------	---	---	
					Willow oak----------	---	---	
					Red maple----------	---	---	
					Shortleaf pine-------	---	---	
					Sweetgum----------	---	---	
					Eastern redcedar-----	---	---	
					Shagbark hickory-----	---	---	
SvB, SvD---------- Stoneville	8A	Slight	Slight	Slight	Shortleaf pine-------	75	120	Loblolly pine, hardwoods***.
					Yellow poplar--------	91	92	
					Virginia pine--------	60	91	
					Sweetgum----------	---	---	
					White oak----------	71	53	
					White ash----------	---	---	
					Hickory----------	---	---	
					Black oak----------	---	---	
					Post oak----------	---	---	
					Southern red oak-----	---	---	
					Crimson oak----------	---	---	
					Maple----------	---	---	
					American beech-------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Potential productivity: Common trees	Site index	Volume*	Trees to plant
SvE---------- Stoneville	8R	Slight	Moderate	Moderate	Shortleaf pine-------	75	120	Loblolly pine, hardwoods***.
					Yellow poplar--------	91	92	
					Virginia pine--------	60	91	
					Sweetgum----------	---	---	
					White oak----------	71	53	
					White ash----------	---	---	
					Hickory----------	---	---	
					Black oak----------	---	---	
					Post oak----------	---	---	
					Southern red oak-----	---	---	
					Crimson oak----------	---	---	
					Maple----------	---	---	
					American beech-------	---	---	
VaB, VaD---------- Vance	7A	Slight	Slight	Slight	Loblolly pine**------	76	103	Loblolly pine, shortleaf pine.
					Shortleaf pine-------	---	---	
					White oak----------	---	---	
					Hickory----------	---	---	
					Yellow poplar--------	---	---	
					Southern red oak-----	---	---	
					Sweetgum----------	---	---	
					Virginia pine--------	---	---	
					Black oak----------	---	---	
WaD---------- Wateree	7A	Slight	Slight	Slight	Loblolly pine**------	77	105	Loblolly pine, shortleaf pine.
					Southern red oak-----	72	54	
					Post oak----------	---	---	
					Sweetgum----------	---	---	
					Hickory----------	---	---	
					Maple----------	---	---	
					Chestnut oak---------	---	---	
WaF---------- Wateree	7R	Moderate	Moderate	Moderate	Loblolly pine**------	77	105	Loblolly pine, shortleaf pine.
					Southern red oak-----	72	54	
					Post oak----------	---	---	
					Sweetgum----------	---	---	
					Hickory----------	---	---	
					Maple----------	---	---	
					Chestnut oak---------	---	---	
We---------- Wehadkee	9W	Slight	Severe	Severe	Loblolly pine**------	102	159	Loblolly pine, hardwoods***.
					Sweetgum----------	93	116	
					Willow oak----------	---	---	
					Green ash----------	---	---	
					Water oak----------	---	---	
					White ash----------	---	---	
WhB---------- Wickham	9A	Slight	Slight	Slight	Loblolly pine**------	90	131	Loblolly pine, hardwoods***.
					Yellow poplar--------	100	107	
					Southern red oak-----	---	---	
					Virginia pine--------	---	---	
					Shortleaf pine-------	---	---	
					Black oak----------	---	---	
					White oak----------	---	---	
					Sweetgum----------	---	---	
					Hickory----------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Potential productivity: Common trees	Site index	Volume*	Trees to plant
WkC---------- Wilkes	7D	Slight	Slight	Slight	Loblolly pine**------	75	101	Loblolly pine, shortleaf pine.
					Post oak----------	79	61	
					Shortleaf pine-------	63	95	
					Southern red oak-----	76	58	
					Sweetgum----------	82	84	
					Hickory----------	---	---	
					Virginia pine--------	---	---	
					Eastern redcedar-----	---	---	
WkF---------- Wilkes	7R	Moderate	Moderate	Slight	Loblolly pine**------	75	101	Loblolly pine, shortleaf pine.
					Post oak----------	79	61	
					Shortleaf pine-------	63	95	
					Southern red oak-----	76	58	
					Sweetgum----------	82	84	
					Hickory----------	---	---	
					Virginia pine--------	---	---	
					Eastern redcedar-----	---	---	

* Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stand.

** Loblolly pine does not naturally grow in Rockingham County but does grow in areas of this soil farther east on the piedmont of North Carolina. It is listed here to show the relative productivity of the soil. It can be planted for good economic returns in the county.

*** To establish hardwoods on a forested site, rely on natural reproduction (seeds and sprouts) of acceptable species. Special site preparation may be required. Planting of hardwoods on a specific site should be based upon the recommendations of a forester.

TABLE 8.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
ApB Appling	Slight	Slight	Moderate: slope.	Slight	Slight.
ApD Appling	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
AyC Ayersville	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, large stones.
AyF Ayersville	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
CcB, CdB2 Cecil	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
CeC*:					
Cecil	Slight	Slight	Severe: slope.	Slight	Slight.
Urban land.					
Ch Chastain	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Ck Chewacla	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Co Congaree	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
CrB Creedmoor	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Moderate: wetness.	Moderate: wetness.
DoB Dogue	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, small stones, wetness.	Moderate: wetness.	Moderate: wetness.
HeB Helena	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness.	Moderate: wetness.
HwB Hiwassee	Slight	Slight	Moderate: slope.	Slight	Slight.
HwD Hiwassee	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
IrB Iredell	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
IrD Iredell	Severe: wetness.	Moderate: slope, wetness.	Severe: slope, wetness.	Moderate: wetness.	Moderate: wetness, slope.
LeB Leaksville	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
LkB*:					
Leaksville	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Urban land.					
MaD Madison	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
MaE Madison	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
MbB2 Madison	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
MbD2 Madison	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
MbE2 Madison	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
McC2*:					
Madison	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Udorthents.					
MdB Mayodan	Slight	Slight	Moderate: slope.	Slight	Slight.
MdD Mayodan	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
MdE Mayodan	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
MeB2 Mayodan	Slight	Slight	Moderate: slope.	Slight	Slight.
MeD2 Mayodan	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
MeE2 Mayodan	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
MfC*:					
Mayodan	Slight	Slight	Severe: slope.	Slight	Slight.
Urban land.					

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
MkB2 Mecklenburg	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
PaD Pacolet	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
PaE Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
PaF Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
PcD2 Pacolet	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
PcE2 Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
PnC Pinkston	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, droughty.
PnF Pinkston	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Pt*, Qu*. Pits					
RnB Rion	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
RnD Rion	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope.
RnE Rion	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
RoC*:					
Rion	Slight	Slight	Severe: slope.	Slight	Moderate: droughty.
Urban land.					
SeB Sedgefield	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
SpB Spray	Slight	Slight	Moderate: slope.	Slight	Slight.
SuB*:					
Spray	Slight	Slight	Moderate: slope.	Slight	Slight.
Urban land.					
SvB Stoneville	Slight	Slight	Moderate: slope.	Slight	Moderate: large stones.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
SvD Stoneville	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: large stones, slope.
SvE Stoneville	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
SwC*:					
Stoneville	Slight	Slight	Severe: slope.	Slight	Moderate: large stones.
Urban land.					
Ud*. Udorthents					
Ur*. Urban land					
VaB Vance	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones.	Slight	Slight.
VaD Vance	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
WaD Wateree	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, droughty.
WaF Wateree	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
We Wehadkee	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
WhB Wickham	Slight	Slight	Moderate: slope.	Slight	Slight.
WkC Wilkes	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Slight	Severe: depth to rock.
WkF Wilkes	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
ApB Appling	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ApD Appling	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
AyC Ayersville	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
AyF Ayersville	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
CcB Cecil	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CdB2 Cecil	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CeC*:										
Cecil	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Urban land.										
Ch Chastain	Very poor.	Poor	Poor	Fair	Poor	Good	Good	Poor	Fair	Good.
Ck Chewacla	Very poor.	Poor	Poor	Good	Good	Fair	Fair	Poor	Good	Fair.
Co Congaree	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
CrB Creedmoor	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
DoB Dogue	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
HeB Helena	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
HwB Hiwassee	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
HwD Hiwassee	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
IrB, IrD Iredell	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
LeB Leaksville	Poor	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair.
LkB*:										
Leaksville	Poor	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
LkB*:										
Urban land.										
MaD Madison	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MaE Madison	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
MbB2 Madison	Fair	Fair	Fair	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
MbD2 Madison	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
MbE2 Madison	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
McC2*:										
Madison	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Udorthents.										
MdB Mayodan	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MdD Mayodan	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MdE Mayodan	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
MeB2 Mayodan	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MeD2 Mayodan	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MeE2 Mayodan	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
MfC*:										
Mayodan	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Urban land.										
MkB2 Mecklenburg	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
PaD Pacolet	Poor	Fair	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
PaE, PaF Pacolet	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
PcD2 Pacolet	Very poor.	Poor	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
PcE2 Pacolet	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
PnC Pinkston	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
PnF Pinkston	Very poor.	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Pt*, Qu*. Pits										
RnB Rion	Fair	Good	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
RnD Rion	Poor	Fair	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
RnE Rion	Poor	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
RoC*:										
Rion	Fair	Good	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Urban land.										
SeB Sedgefield	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
SpB Spray	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
SuB*:										
Spray	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Urban land.										
SvB Stoneville	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
SvD Stoneville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
SvE Stoneville	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
SwC*:										
Stoneville	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Urban land.										
Ud*. Udorthents										
Ur*. Urban land										

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
VaB---------- Vance	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
VaD---------- Vance	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
WaD---------- Wateree	Poor	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
WaF---------- Wateree	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
We---------- Wehadkee	Very poor.	Poor	Poor	Fair	Fair	Good	Fair	Poor	Fair	Fair.
WhB---------- Wickham	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WkC---------- Wilkes	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
WkF---------- Wilkes	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
ApB Appling	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
ApD Appling	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.	Moderate: slope.
AyC Ayersville	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Severe: low strength.	Moderate: small stones, large stones.
AyF Ayersville	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
CcB, CdB2 Cecil	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
CeC*:						
Cecil	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
Urban land.						
Ch Chastain	Severe: wetness, cutbanks cave.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
Ck Chewacla	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
Co Congaree	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
CrB Creedmoor	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Moderate: wetness, shrink-swell.	Severe: low strength.	Moderate: wetness.
DoB Dogue	Severe: cutbanks cave, wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength.	Moderate: wetness.
HeB Helena	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.
HwB Hiwassee	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Severe: low strength.	Slight.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
HwD---------- Hiwassee	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
IrB---------- Iredell	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell .	Severe: low strength, shrink-swell.	Moderate: wetness.
IrD---------- Iredell	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell , slope.	Severe: low strength, shrink-swell.	Moderate: wetness, slope.
LeB---------- Leaksville	Severe: depth to rock, wetness.	Severe: wetness, shrink-swell.	Severe: wetness, depth to rock, shrink-swell.	Severe: wetness, shrink-swell .	Severe: low strength, wetness, shrink-swell.	Severe: wetness.
LkB*:						
Leaksville-------	Severe: depth to rock, wetness.	Severe: wetness, shrink-swell.	Severe: wetness, depth to rock, shrink-swell.	Severe: wetness, shrink-swell .	Severe: low strength, wetness, shrink-swell.	Severe: wetness.
Urban land.						
MaD---------- Madison	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
MaE---------- Madison	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
MbB2---------- Madison	Moderate: too clayey.	Slight---------	Slight---------	Moderate: slope.	Severe: low strength.	Slight.
MbD2---------- Madison	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
MbE2---------- Madison	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
McC2*:						
Madison----------	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
Udorthents.						
MdB---------- Mayodan	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: low strength.	Slight.
MdD---------- Mayodan	Moderate: too clayey, slope.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
MdE---------- Mayodan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
MeB2---------- Mayodan	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: low strength.	Slight.
MeD2---------- Mayodan	Moderate: too clayey, slope.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
MeE2---------- Mayodan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
MfC*:						
Mayodan----------	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: low strength.	Slight.
Urban land.						
MkB2---------- Mecklenburg	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
PaD---------- Pacolet	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
PaE, PaF---------- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
PcD2---------- Pacolet	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
PcE2---------- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
PnC---------- Pinkston	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock.	Moderate: slope, droughty.
PnF---------- Pinkston	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
Pt*, Qu*. Pits						
RnB---------- Rion	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Moderate: droughty.
RnD---------- Rion	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
RnE: Rion	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
RoC*:						
Rion	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
Urban land.						
SeB: Sedgefield	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.
SpB: Spray	Slight	Slight	Slight	Slight	Severe: low strength.	Slight.
SuB*:						
Spray	Slight	Slight	Slight	Slight	Severe: low strength.	Slight.
Urban land.						
SvB: Stoneville	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Moderate: large stones.
SvD: Stoneville	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, slope.	Severe: slope.	Severe: low strength.	Moderate: large stones, slope.
SvE: Stoneville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
SwC*:						
Stoneville	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Moderate: large stones.
Urban land.						
Ud*. Udorthents						
Ur*. Urban land						
VaB: Vance	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
VaD: Vance	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
WaD: Wateree	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope.	Moderate: slope, droughty, depth to rock.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
WaF---------- Wateree	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
We---------- Wehadkee	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.
WhB---------- Wickham	Slight---------	Slight---------	Slight---------	Slight---------	Slight---------	Slight.
WkC---------- Wilkes	Severe: depth to rock.	Moderate: shrink-swell, depth to rock.	Severe: depth to rock.	Moderate: shrink-swell, depth to rock.	Moderate: depth to rock, shrink-swell.	Severe: depth to rock.
WkF---------- Wilkes	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
ApB---------- Appling	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey.
ApD---------- Appling	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
AyC---------- Ayersville	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
AyF---------- Ayersville	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Poor: depth to rock, slope.
CcB, CdB2---------- Cecil	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey.
CeC*:					
Cecil----------	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey.
Urban land.					
Ch---------- Chastain	Severe: flooding, wetness, percs slowly.	Severe: flooding, seepage.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness.	Poor: wetness, too clayey, hard to pack.
Ck---------- Chewacla	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: hard to pack, wetness.
Co---------- Congaree	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
CrB---------- Creedmoor	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
DoB---------- Dogue	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
HeB---------- Helena	Severe: wetness, percs slowly.	Severe: wetness.	Severe: depth to rock, wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
HwB---------- Hiwassee	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey, hard to pack.
HwD---------- Hiwassee	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
IrB---------- Iredell	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
IrD---------- Iredell	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
LeB---------- Leaksville	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness, too clayey.	Severe: depth to rock, wetness.	Poor: too clayey, hard to pack.
LkB*:					
Leaksville---------	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness, too clayey.	Severe: depth to rock, wetness.	Poor: too clayey, hard to pack.
Urban land.					
MaD---------- Madison	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Poor: thin layer.
MaE---------- Madison	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope, thin layer.
MbB2---------- Madison	Moderate: percs slowly.	Moderate: seepage, slope.	Slight----------	Slight----------	Poor: thin layer.
MbD2---------- Madison	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Poor: thin layer.
MbE2---------- Madison	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope, thin layer.
McC2*:					
Madison----------	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Poor: thin layer.
Udorthents.					

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
MdB---------- Mayodan	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey, hard to pack.
MdD---------- Mayodan	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
MdE---------- Mayodan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
MeB2---------- Mayodan	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey, hard to pack.
MeD2---------- Mayodan	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
MeE2---------- Mayodan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
MfC*:					
Mayodan----------	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey, hard to pack.
Urban land.					
MkB2---------- Mecklenburg	Severe: percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
PaD---------- Pacolet	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: too clayey, slope.
PaE, PaF---------- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
PcD2---------- Pacolet	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: too clayey, slope.
PcE2---------- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
PnC---------- Pinkston	Severe: depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: small stones.
PnF---------- Pinkston	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage, depth to rock.	Severe: slope, seepage, depth to rock.	Poor: small stones, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Pt*, Qu*. Pits					
RnB Rion	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too clayey.
RnD Rion	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too clayey, slope.
RnE Rion	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
RoC*:					
Rion	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too clayey.
Urban land.					
SeB Sedgefield	Severe: wetness, percs slowly.	Severe: wetness.	Severe: depth to rock, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
SpB Spray	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Poor: small stones.
SuB*:					
Spray	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Poor: small stones.
Urban land.					
SvB Stoneville	Moderate: depth to rock, percs slowly.	Moderate: depth to rock, seepage, slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
SvD Stoneville	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
SvE Stoneville	Severe: slope.	Severe: slope.	Severe: depth to rock, too clayey, slope.	Severe: slope.	Poor: too clayey, slope, hard to pack.
SwC*:					
Stoneville	Moderate: depth to rock, percs slowly.	Moderate: depth to rock, seepage, slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
Urban land.					
Ud*. Udorthents					

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ur*. Urban land					
VaB Vance	Severe: percs slowly.	Moderate: depth to rock, slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
VaD Vance	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
WaD Wateree	Severe: depth to rock.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: thin layer.
WaF Wateree	Severe: depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: thin layer, slope.
We Wehadkee	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
WhB Wickham	Slight	Moderate: seepage, slope.	Severe: seepage.	Slight	Fair: thin layer.
WkC Wilkes	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: thin layer, depth to rock.
WkF Wilkes	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Poor: thin layer, depth to rock.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
ApB, ApD: Appling	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
AyC: Ayersville	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
AyF: Ayersville	Poor: slope, depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
CcB, CdB2: Cecil	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
CeC*:				
Cecil	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Urban land.				
Ch: Chastain	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too clayey, wetness.
Ck: Chewacla	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Co: Congaree	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
CrB: Creedmoor	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
DoB: Dogue	Fair: wetness.	Probable	Improbable: too sandy.	Poor: thin layer.
HeB: Helena	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
HwB, HwD: Hiwassee	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
IrB, IrD: Iredell	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
LeB: Leaksville	Poor: area reclaim, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, wetness.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
LkB*:				
Leaksville	Poor: area reclaim, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, wetness.
Urban land.				
MaD Madison	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
MaE Madison	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
MbB2, MbD2 Madison	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
MbE2 Madison	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
McC2*:				
Madison	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Udorthents.				
MdB, MdD Mayodan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
MdE Mayodan	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
MeB2, MeD2 Mayodan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
MeE2 Mayodan	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
MfC*:				
Mayodan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Urban land.				
MkB2 Mecklenburg	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
PaD Pacolet	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
PaE Pacolet	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
PaF Pacolet	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
PcD2 Pacolet	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
PcE2 Pacolet	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
PnC Pinkston	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
PnF Pinkston	Poor: slope, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Pt*, Qu*. Pits				
RnB Rion	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
RnD Rion	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
RnE Rion	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
RoC*:				
Rion	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Urban land.				
SeB Sedgefield	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
SpB Spray	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
SuB*:				
Spray	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
Urban land.				
SvB, SvD Stoneville	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
SvE Stoneville	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, thin layer.
SwC*:				
Stoneville	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Urban land.				

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Ud*. Udorthents				
Ur*. Urban land				
VaB, VaD Vance	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
WaD Wateree	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: depth to rock.
WaF Wateree	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
We Wehadkee	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
WhB Wickham	Fair: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Good.
WkC Wilkes	Poor: depth to rock, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, depth to rock.
WkF Wilkes	Poor: depth to rock, slope, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, thin layer, depth to rock.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
ApB Appling	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope	Favorable	Favorable.
ApD Appling	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
AyC, AyF Ayersville	Severe: slope.	Severe: piping.	Deep to water	Depth to rock, slope.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
CcB, CdB2 Cecil	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Favorable	Favorable.
CeC*:						
Cecil	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Favorable	Favorable.
Urban land.						
Ch Chastain	Moderate: seepage.	Severe: hard to pack, wetness.	Percs slowly, flooding.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Ck Chewacla	Moderate: seepage.	Severe: piping, hard to pack, wetness.	Flooding	Wetness, flooding.	Wetness	Wetness.
Co Congaree	Moderate: seepage.	Severe: piping.	Flooding	Wetness	Erodes easily, wetness.	Erodes easily.
CrB Creedmoor	Slight	Severe: hard to pack.	Percs slowly	Wetness, percs slowly.	Wetness, percs slowly.	Percs slowly.
DoB Dogue	Moderate: seepage.	Severe: wetness.	Favorable	Wetness, erodes easily.	Erodes easily, wetness.	Erodes easily.
HeB Helena	Moderate: depth to rock, slope.	Severe: hard to pack.	Percs slowly, slope.	Wetness, percs slowly.	Wetness, percs slowly.	Percs slowly.
HwB Hiwassee	Moderate: seepage, slope.	Moderate: hard to pack.	Deep to water	Slope	Favorable	Favorable.
HwD Hiwassee	Severe: slope.	Moderate: hard to pack.	Deep to water	Slope	Slope	Slope.
IrB Iredell	Moderate: slope.	Severe: hard to pack.	Percs slowly, slope.	Wetness, soil blowing, percs slowly.	Wetness, soil blowing.	Wetness, percs slowly.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
IrD Iredell	Severe: slope.	Severe: hard to pack.	Percs slowly, slope.	Wetness, soil blowing, percs slowly.	Slope, wetness, soil blowing.	Wetness, slope, percs slowly.
LeB Leaksville	Moderate: depth to rock.	Severe: hard to pack, wetness.	Percs slowly, depth to rock.	Wetness, percs slowly, depth to rock.	Depth to rock, erodes easily, wetness.	Wetness, erodes easily, depth to rock.
LkB*:						
Leaksville	Moderate: depth to rock.	Severe: hard to pack, wetness.	Percs slowly, depth to rock.	Wetness, percs slowly, depth to rock.	Depth to rock, erodes easily, wetness.	Wetness, erodes easily, depth to rock.
Urban land.						
MaD, MaE Madison	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
MbB2 Madison	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope	Favorable	Favorable.
MbD2, MbE2 Madison	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
McC2*:						
Madison	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
Udorthents.						
MdB Mayodan	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Favorable	Favorable.
MdD Mayodan	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
MdE Mayodan	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
MeB2 Mayodan	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Favorable	Favorable.
MeD2 Mayodan	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
MeE2 Mayodan	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
MfC*:						
Mayodan	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Favorable	Favorable.
Urban land.						
MkB2 Mecklenburg	Moderate: depth to rock, slope, seepage.	Severe: hard to pack.	Deep to water	Percs slowly, slope.	Percs slowly	Percs slowly.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
PaD, PaE, PaF: Pacolet	Severe: slope.	Moderate: piping.	Deep to water	Slope	Soil blowing, slope.	Slope.
PcD2, PcE2: Pacolet	Severe: slope.	Moderate: piping.	Deep to water	Slope	Slope	Slope.
PnC, PnF: Pinkston	Severe: seepage, slope.	Severe: piping.	Deep to water	Droughty, depth to rock, slope.	Depth to rock, slope.	Slope, droughty, depth to rock.
Pt*, Qu*. Pits						
RnB: Rion	Severe: seepage.	Severe: piping.	Deep to water	Droughty, slope.	Soil blowing	Droughty.
RnD, RnE: Rion	Severe: seepage, slope.	Severe: piping.	Deep to water	Droughty, slope.	Soil blowing, slope.	Slope, droughty.
RoC*:						
Rion	Severe: seepage.	Severe: piping.	Deep to water	Droughty, slope.	Soil blowing	Droughty.
Urban land.						
SeB: Sedgefield	Moderate: seepage, depth to rock, slope.	Severe: hard to pack.	Percs slowly, slope.	Slope, wetness.	Wetness, percs slowly.	Wetness, percs slowly.
SpB: Spray	Moderate: seepage.	Moderate: piping.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
SuB*:						
Spray	Moderate: seepage.	Moderate: piping.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
Urban land.						
SvB: Stoneville	Moderate: seepage, depth to rock, slope.	Severe: hard to pack.	Deep to water	Slope	Favorable	Favorable.
SvD, SvE: Stoneville	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
SwC*:						
Stoneville	Moderate: seepage, depth to rock, slope.	Severe: hard to pack.	Deep to water	Slope	Favorable	Favorable.
Urban land.						
Ud*. Udorthents						

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
Ur*. Urban land						
VaB Vance	Moderate: depth to rock, slope.	Severe: hard to pack.	Deep to water	Percs slowly, slope.	Percs slowly	Percs slowly.
VaD Vance	Severe: slope.	Severe: hard to pack.	Deep to water	Percs slowly, slope.	Slope, percs slowly.	Slope, percs slowly.
WaD Wateree	Severe: seepage, slope.	Severe: piping.	Deep to water	Droughty, slope, depth to rock.	Slope, depth to rock.	Slope, droughty, depth to rock.
WaF Wateree	Severe: seepage, slope.	Severe: piping.	Deep to water	Droughty, slope.	Slope, depth to rock.	Slope, droughty, depth to rock.
We Wehadkee	Moderate: seepage.	Severe: wetness.	Flooding	Wetness, flooding.	Wetness	Wetness.
WhB Wickham	Moderate: seepage.	Moderate: thin layer.	Deep to water	Favorable	Favorable	Favorable.
WkC Wilkes	Severe: depth to rock.	Severe: thin layer.	Deep to water	Slope, depth to rock.	Depth to rock	Depth to rock.
WkF Wilkes	Severe: slope, depth to rock.	Severe: thin layer.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
ApB, ApD--------- Appling	0-9	Sandy loam-------	SM	A-2	0-5	86-100	80-100	55-91	15-35	<27	NP-5
	9-35	Sandy clay, clay loam, clay.	MH, ML, CL	A-7	0-5	95-100	90-100	70-95	51-80	41-74	15-30
	35-46	Sandy clay, clay loam, sandy clay loam.	SC, CL	A-4, A-6, A-7	0-5	95-100	85-100	70-90	40-75	25-45	8-22
	46-65	Variable---------	---	---	---	---	---	---	---	---	---
AyC, AyF--------- Ayersville	0-8	Gravelly loam----	SM-SC, SC, CL-ML, CL	A-4, A-6, A-7-6	10-20	75-100	70-100	65-100	40-75	25-49	4-25
	8-22	Gravelly silt loam, gravelly loam, loam.	CL, CL-ML, ML	A-4, A-6, A-7	0-20	75-100	70-100	65-100	50-85	25-49	4-25
	22-26	Gravelly silt loam, gravelly loam.	CL-ML, ML	A-4	10-45	75-100	70-100	65-100	50-85	<35	NP-10
	26-30	Weathered bedrock	---	---	---	---	---	---	---	---	---
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
CcB---------- Cecil	0-6	Sandy loam-------	SM, SM-SC	A-2, A-4	0-5	84-100	80-100	67-90	26-42	<30	NP-6
	6-52	Clay, clay loam	MH, ML, CL	A-7, A-5	0-5	97-100	92-100	72-99	55-95	41-80	9-37
	52-80	Variable---------	---	---	---	---	---	---	---	---	---
CdB2---------- Cecil	0-6	Sandy clay loam	SM, SC, CL, ML	A-4, A-6	0-5	74-100	72-100	68-95	38-81	21-35	3-15
	6-52	Clay, clay loam	MH, ML, CL	A-7, A-5	0-5	97-100	92-100	72-99	55-95	41-80	9-37
	52-80	Variable---------	---	---	---	---	---	---	---	---	---
CeC*:											
Cecil----------	0-6	Sandy loam-------	SM, SM-SC	A-2, A-4	0-5	84-100	80-100	67-90	26-42	<30	NP-6
	6-52	Clay, clay loam	MH, ML, CL	A-7, A-5	0-5	97-100	92-100	72-99	55-95	41-80	9-37
	52-80	Variable---------	---	---	---	---	---	---	---	---	---
Urban land.											
Ch---------- Chastain	0-6	Silty clay loam	ML, CL, CL-ML	A-4, A-6, A-7	0	100	100	90-100	70-95	23-45	3-18
	6-64	Silty clay loam, silty clay, clay.	CL, CH, ML, MH	A-6, A-7	0	100	100	95-100	85-98	35-75	12-40
Ck---------- Chewacla	0-9	Loam----------	ML, CL, CL-ML	A-4, A-6, A-7	0	98-100	95-100	70-100	55-90	25-49	4-20
	9-60	Sandy clay loam, loam, sandy loam.	SM, SM-SC, ML	A-4, A-7-6, A-6	0	96-100	95-100	60-96	36-70	20-45	NP-15
Co---------- Congaree	0-9	Loam----------	CL-ML, ML, CL	A-4	0	95-100	95-100	70-100	51-90	20-35	3-10
	9-72	Silty clay loam, sandy loam, loam.	SC, ML, CL, SM	A-4, A-6, A-7	0	95-100	95-100	70-100	40-90	25-50	3-22

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
CrB---------- Creedmoor	0-11	Fine sandy loam	SM, SM-SC	A-4, A-2	0-3	98-100	95-100	70-90	30-49	<25	NP-7
	11-47	Clay, silty clay, sandy clay.	CH	A-7	0-3	98-100	95-100	85-97	70-95	51-79	25-49
	47-67	Sandy loam, sandy clay loam, loam.	ML, CL-ML, SM, SM-SC	A-7, A-6, A-4	0-5	98-100	95-100	85-98	45-90	25-49	4-21
DoB---------- Dogue	0-10	Loam----------	ML, CL, SM, SC	A-4	0	95-100	75-100	60-100	40-85	<30	NP-10
	10-48	Clay loam, clay, sandy clay loam.	CL, CH, SC	A-6, A-7	0	95-100	75-100	65-100	40-90	35-60	16-40
	48-72	Stratified sand to sandy clay loam.	SM, SC, SP-SM, SM-SC	A-2, A-4, A-1	0	80-100	60-100	35-100	10-40	<30	NP-10
HeB---------- Helena	0-12	Sandy loam-------	SM, SM-SC, SC	A-2, A-4	0-5	95-100	90-100	51-90	26-46	<30	NP-9
	12-16	Sandy clay loam, clay loam.	CL, SC	A-6, A-7	0-5	95-100	95-100	70-90	38-70	30-49	15-26
	16-42	Clay loam, sandy clay, clay.	CH	A-7	0-5	95-100	95-100	73-97	56-86	50-85	24-50
	42-60	Variable---------	---	---	---	---	---	---	---	---	---
HwB, HwD--------- Hiwassee	0-10	Loam----------	CL, ML, CL-ML	A-7-6, A-6, A-4	0-2	95-100	95-100	88-100	50-85	25-49	3-23
	10-64	Clay, sandy clay, clay loam.	CL, ML, MH	A-7-5, A-7-6	0-2	95-100	95-100	80-100	51-95	40-80	12-36
	64-80	Sandy loam, loam, sandy clay loam.	SM, ML, SM-SC, CL	A-4, A-5, A-6, A-7	0-5	90-100	85-99	60-96	36-70	20-49	4-20
IrB, IrD--------- Iredell	0-8	Fine sandy loam	SM, SM-SC, SC	A-2-4, A-4	0-1	90-98	80-96	60-82	30-50	<35	NP-9
	8-25	Clay----------	CH	A-7	0	99-100	60-100	60-100	55-95	54-115	29-85
	25-28	Loam, sandy clay loam, clay loam.	CL, CH, SC	A-7	0-1	98-100	85-100	70-95	40-75	41-60	20-39
	28-60	Variable---------	---	---	---	---	---	---	---	---	---
LeB---------- Leaksville	0-9	Silt loam--------	ML, CL-ML, CL	A-4, A-6, A-7	0-15	90-100	80-95	70-90	50-85	25-49	6-20
	9-18	Clay loam, clay, silty clay.	CH	A-7	0-10	90-100	80-95	75-90	60-90	55-99	35-75
	18-24	Very channery loam, clay loam, silty clay loam.	CL, CH	A-7	5-20	75-90	70-90	65-90	55-85	41-75	20-45
	24-30	Weathered bedrock	---	---	---	---	---	---	---	---	---
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
LkB*:											
Leaksville------	0-9	Silt loam--------	ML, CL-ML, CL	A-4, A-6, A-7	0-15	90-100	80-95	70-90	50-85	25-49	6-20
	9-18	Clay loam, clay, silty clay.	CH	A-7, A-7-6	0-10	90-100	80-95	75-90	60-90	55-99	35-75
	18-24	Very channery loam, clay loam, silty clay loam.	CL, CH	A-7	5-20	75-90	70-90	65-90	55-85	41-75	20-45
	24-30	Weathered bedrock	---	---	---	---	---	---	---	---	---
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Urban land.											

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
MaD, MaE--------- Madison	0-8	Sandy loam-------	SM	A-2, A-4	0-3	85-100	80-100	60-90	26-49	<35	NP-8
	8-25	Clay, clay loam, sandy clay.	MH, ML	A-7	0-3	90-100	85-100	75-97	57-85	43-75	12-35
	25-31	Loam, sandy clay loam, clay loam.	CL	A-4, A-6	0-3	90-100	85-100	70-95	50-80	20-40	7-20
	31-60	Variable---------	---	---	---	---	---	---	---	---	---
MbB2, MbD2, MbE2- Madison	0-8	Sandy clay loam	CL, ML	A-4, A-6	0-3	90-100	85-100	70-95	50-80	20-40	7-20
	8-25	Clay, clay loam, sandy clay.	MH, ML	A-7	0-3	90-100	85-100	75-97	57-85	43-75	12-35
	25-31	Loam, sandy clay loam, clay loam.	CL	A-4, A-6	0-3	90-100	85-100	70-95	50-80	20-40	7-20
	31-60	Variable---------	---	---	---	---	---	---	---	---	---
McC2*:											
Madison---------	0-8	Sandy clay loam	CL, ML	A-4, A-6	0-3	90-100	85-100	70-95	50-80	20-40	7-20
	8-25	Clay, clay loam, sandy clay.	MH, ML	A-7	0-3	90-100	85-100	75-97	57-85	43-75	12-35
	25-31	Loam, sandy clay loam, clay loam.	CL	A-4, A-6	0-3	90-100	85-100	70-95	50-80	20-40	7-20
	31-60	Variable---------	---	---	---	---	---	---	---	---	---
Udorthents.											
MdB, MdD, MdE---- Mayodan	0-7	Sandy loam-------	SM, ML, SM-SC	A-2, A-4	0-5	92-100	90-100	49-98	30-70	<36	NP-5
	7-50	Clay, sandy clay, clay loam.	MH, CH, CL, ML	A-7	0-2	95-100	90-100	80-100	40-98	41-80	15-45
	50-72	Variable---------	---	---	---	---	---	---	---	---	---
MeB2, MeD2, MeE2- Mayodan	0-7	Sandy clay loam	CL, SC	A-4, A-6, A-7-6	0-5	95-100	95-100	90-100	40-90	25-50	7-26
	7-50	Clay, sandy clay, clay loam.	MH, CH, CL, ML	A-7, A-7-5	0-2	95-100	90-100	80-100	40-98	41-80	15-45
	50-72	Variable---------	---	---	---	---	---	---	---	---	---
MfC*:											
Mayodan---------	0-7	Sandy loam-------	SM, ML, SM-SC	A-2, A-4	0-5	92-100	90-100	49-98	30-70	<36	NP-5
	7-50	Clay, sandy clay, clay loam.	MH, CH, CL, ML	A-7	0-2	95-100	90-100	80-100	40-98	41-80	15-45
	50-72	Variable---------	---	---	---	---	---	---	---	---	---
Urban land.											
MkB2---------- Mecklenburg	0-7	Sandy clay loam	CL	A-6, A-7-6	0-5	90-100	90-100	80-100	50-80	25-49	11-25
	7-22	Clay----------	CH, MH	A-7	0-5	90-100	85-100	80-100	75-95	51-75	20-43
	22-30	Loam, sandy clay loam, clay loam.	CL	A-4, A-6, A-7	0-5	90-100	85-100	80-100	50-80	25-49	8-25
	30-72	Variable---------	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
PaD, PaE, PaF---- Pacolet	0-6	Sandy loam-------	SM, SM-SC	A-2, A-1-b	0-2	85-100	80-100	42-80	16-35	<28	NP-7
	6-25	Sandy clay, clay loam, clay.	ML, MH	A-6, A-7	0-1	80-100	80-100	60-95	51-75	38-65	11-30
	25-35	Clay loam, sandy clay loam, sandy loam.	CL, CL-ML, SM-SC, SC	A-2, A-4, A-6	0-2	80-100	70-100	60-80	30-60	20-35	5-15
	35-60	Sandy loam, sandy clay loam, loam.	SM, SM-SC	A-4, A-2-4	0-2	80-100	70-100	60-80	30-50	<28	NP-6
PcD2, PcE2------- Pacolet	0-6	Sandy clay loam	SM-SC, SC	A-4, A-6	0-1	95-100	90-100	65-85	36-50	20-40	4-17
	6-25	Sandy clay, clay loam, clay.	ML, MH	A-6, A-7	0-1	80-100	80-100	60-95	51-75	38-65	11-30
	25-35	Clay loam, sandy clay loam, sandy loam.	CL, CL-ML, SM-SC, SC	A-2, A-4, A-6	0-2	80-100	70-100	60-80	30-60	20-35	5-15
	35-60	Sandy loam, sandy clay loam, loam.	SM, SM-SC	A-4, A-2-4	0-2	80-100	70-100	60-80	30-50	<28	NP-6
PnC, PnF--------- Pinkston	0-5	Fine sandy loam	CL, ML, SM, SC	A-2, A-4	0-5	80-100	75-100	45-95	25-65	<35	NP-10
	5-16	Loam, sandy loam, silt loam, gravelly sandy loam.	SC, CL, CL-ML, ML, SM	A-2, A-4, A-1	0-10	70-100	50-100	35-95	20-75	<30	NP-10
	16-23	Gravelly sandy loam, loam, silt loam.	CL, GM, SM, GP-GM ML	A-1, A-2, A-4, A-6	0-10	40-100	35-98	20-95	10-60	16-35	NP-15
	23	Weathered bedrock	---	---	---	---	---	---	---	---	---
Pt*, Qu*. Pits											
RnB, RnD, RnE---- Rion	0-10	Sandy loam-------	SM	A-2, A-4	0-2	90-100	85-100	60-80	20-45	<35	NP-7
	10-34	Loam, sandy clay loam, clay loam.	SC, SM-SC, CL-ML, CL	A-2, A-4, A-6	0-2	90-100	85-100	60-85	30-60	20-35	5-15
	34-60	Sandy loam, sandy clay loam, loamy sand.	SC, SM, SM-SC	A-2, A-4, A-6	0-2	90-100	80-100	60-85	15-50	<36	NP-12
RoC*:											
Rion----------	0-10	Sandy loam-------	SM	A-2, A-4	0-2	90-100	85-100	60-80	20-45	<35	NP-7
	10-34	Loam, sandy clay loam, clay loam.	SC, SM-SC, CL-ML, CL	A-2, A-4, A-6	0-2	90-100	85-100	60-85	30-60	20-35	5-15
	34-60	Sandy loam, sandy clay loam, loamy sand.	SC, SM, SM-SC	A-2, A-4, A-6	0-2	90-100	80-100	60-85	15-50	<36	NP-12
Urban land.											
SeB---------- Sedgefield	0-4	Sandy loam-------	SM-SC, CL, CL-ML, SC	A-2, A-4, A-6	0-5	85-100	85-100	51-90	27-55	10-35	5-20
	4-35	Sandy clay, clay loam, clay.	CL, CH	A-7	0-5	95-100	95-100	73-93	60-85	45-85	25-60
	35-60	Variable---------	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
SpB---------- Spray	0-6	Loam----------	CL-ML, CL, ML	A-4, A-6, A-7, A-7-5	0-5	85-100	80-100	65-95	50-85	20-49	5-25
	6-17	Clay loam, clay, silty clay.	ML, MH, CL	A-7, A-7-6	3-10	85-100	80-100	75-100	65-90	45-75	15-40
	17-60	Variable---------	---	---	---	---	---	---	---	---	---
SuB*:											
Spray----------	0-6	Loam----------	CL-ML, CL, ML	A-4, A-6, A-7	0-5	85-100	80-100	65-95	50-85	20-49	5-25
	6-17	Clay loam, clay, silty clay.	ML, MH, CL	A-7	3-10	85-100	80-100	75-100	65-90	45-75	15-40
	17-60	Variable---------	---	---	---	---	---	---	---	---	---
Urban land.											
SvB, SvD, SvE---- Stoneville	0-5	Loam----------	CL, ML, CL-ML	A-4, A-6, A-7-5, A-7-6	0-8	95-100	90-100	75-100	50-90	24-49	6-20
	5-13	Clay loam, silty clay loam, loam.	CL	A-6, A-7-6	0-5	95-100	95-100	85-100	51-80	25-49	11-25
	13-38	Clay, clay loam, silty clay.	CL, CH	A-7, A-7-6	0-5	95-100	95-100	90-100	51-95	40-70	17-42
	38-48	Clay loam, silty clay loam, loam.	CL, ML	A-7	0-5	95-100	95-100	85-100	51-97	25-49	11-23
	48-72	Weathered bedrock	---	---	---	---	---	---	---	---	---
SwC*:											
Stoneville------	0-5	Loam----------	CL, ML, CL-ML	A-4, A-6, A-7-5, A-7-6	0-8	95-100	90-100	75-100	50-90	24-49	6-20
	5-13	Clay loam, silty clay loam, loam.	CL	A-6, A-7-6	0-5	95-100	95-100	85-100	51-80	25-49	11-25
	13-38	Clay, clay loam, silty clay.	CL, CH	A-7, A-7-6	0-5	95-100	95-100	90-100	51-95	40-70	17-42
	38-48	Clay loam, silty clay loam, loam.	CL, ML	A-7	0-5	95-100	95-100	85-100	51-97	25-49	11-23
	48-72	Weathered bedrock	---	---	---	---	---	---	---	---	---
Urban land.											
Ud*. Udorthents											
Ur*. Urban land											
VaB, VaD--------- Vance	0-8	Sandy loam-------	SM, SM-SC	A-2, A-4	0-5	90-100	80-100	55-80	15-40	<27	NP-7
	8-36	Clay loam, sandy clay, clay.	CH	A-7	0-5	95-100	90-100	75-95	65-80	51-80	25-48
	36-60	Variable---------	---	---	---	---	---	---	---	---	---
WaD---------- Wateree	0-10	Fine sandy loam	SM	A-2	0-5	80-100	75-95	45-80	25-35	<30	NP-7
	10-22	Sandy loam-------	SM	A-2, A-4	0-5	85-100	75-98	50-80	25-40	<30	NP-7
	22-25	Sand, loamy sand, sandy loam.	SP-SM, SM	A-1, A-2, A-3	0-5	70-100	65-98	40-80	5-35	<25	NP-3
	25-60	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
WaF---------- Wateree	0-10	Loamy sand-------	SM	A-1, A-2	0-5	80-100	75-95	40-75	15-28	---	NP
	10-22	Sandy loam-------	SM	A-2, A-4	0-5	85-100	75-98	50-80	25-40	<30	NP-7
	22-25	Sand, loamy sand, sandy loam.	SP-SM, SM	A-1, A-2, A-3	0-5	70-100	65-98	40-80	5-35	<25	NP-3
	25-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
We---------- Wehadkee	0-7	Silt loam--------	CL, MH, ML	A-6, A-7	0	100	98-100	85-100	51-98	30-58	10-24
	7-47	Loam, silty clay loam, clay loam.	ML, CL, CL-ML	A-6, A-7, A-4	0	100	99-100	85-100	51-90	25-50	7-25
	47-60	Variable---------	---	---	---	---	---	---	---	---	---
WhB---------- Wickham	0-12	Sandy loam-------	SM, SM-SC, ML, CL-ML	A-4	0	95-100	90-100	70-100	45-80	<25	NP-7
	12-50	Sandy clay loam, clay loam, loam.	CL-ML, CL, SC, SM-SC	A-2, A-4, A-6, A-7-6	0	95-100	90-100	75-100	30-70	20-41	5-15
	50-60	Variable---------	---	---	---	---	---	---	---	---	---
WkC, WkF--------- Wilkes	0-7	Sandy loam-------	ML, SM, SM-SC	A-2, A-4	0-10	90-100	80-100	60-92	25-55	<35	NP-7
	7-15	Clay loam, clay, sandy clay loam.	CL, CH	A-6, A-7	0-10	80-100	80-100	75-96	50-85	30-60	11-35
	15-60	Weathered bedrock	---	---	---	---	---	---	---	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
ApB, ApD--------- Appling	0-9	5-20	1.40-1.65	2.0-6.0	0.10-0.15	4.5-5.5	Low----------	0.24	4	.5-2
	9-35	35-60	1.25-1.45	0.6-2.0	0.15-0.17	4.5-5.5	Low----------	0.20		
	35-46	20-50	1.25-1.45	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.24		
	46-65	---	---	---	---	---	----------	----		
AyC, AyF--------- Ayersville	0-8	12-27	1.35-1.55	0.6-6.0	0.10-0.16	4.5-5.5	Low----------	0.28	3	.5-2
	8-22	18-35	1.40-1.60	0.6-2.0	0.12-0.18	4.5-5.5	Low----------	0.28		
	22-26	8-20	1.45-1.65	0.6-2.0	0.10-0.16	4.5-5.5	Low----------	0.28		
	26-30	---	---	---	---	---	----------	----		
	30	---	---	---	---	---	----------	----		
CcB---------- Cecil	0-6	5-20	1.30-1.50	2.0-6.0	0.12-0.14	4.5-6.0	Low----------	0.28	4	.5-2
	6-52	35-70	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low----------	0.28		
	52-80	---	---	---	---	---	----------	----		
CdB2---------- Cecil	0-6	20-35	1.30-1.50	0.6-2.0	0.13-0.15	4.5-6.0	Low----------	0.28	4	.5-1
	6-52	35-70	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low----------	0.28		
	52-80	---	---	---	---	---	----------	----		
CeC*:										
Cecil----------	0-6	5-20	1.30-1.50	2.0-6.0	0.12-0.14	4.5-6.0	Low----------	0.28	4	.5-2
	6-52	35-70	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low----------	0.28		
	52-80	---	---	---	---	---	----------	----		
Urban land.										
Ch---------- Chastain	0-6	15-35	1.20-1.40	0.2-0.6	0.12-0.18	4.5-7.3	Moderate-----	0.32	5	2-6
	6-64	35-60	1.30-1.50	0.06-0.2	0.12-0.16	5.1-7.3	Moderate-----	0.37		
Ck---------- Chewacla	0-9	10-27	1.30-1.60	0.6-2.0	0.15-0.24	5.1-7.3	Low----------	0.28	5	1-4
	9-60	18-35	1.30-1.60	0.6-2.0	0.12-0.20	5.1-7.3	Low----------	0.28		
Co---------- Congaree	0-9	10-25	1.20-1.40	0.6-2.0	0.12-0.20	5.1-6.5	Low----------	0.37	5	<4
	9-72	18-35	1.20-1.50	0.6-2.0	0.12-0.20	5.1-6.5	Low----------	0.37		
CrB---------- Creedmoor	0-11	7-20	1.55-1.70	2.0-6.0	0.10-0.14	3.6-5.5	Low----------	0.28	3	.5-2
	11-47	35-60	1.30-1.50	<0.06	0.13-0.15	3.6-5.5	Moderate-----	0.32		
	47-67	5-27	1.60-1.95	<0.06	0.10-0.14	3.6-5.5	Low----------	0.37		
DoB---------- Dogue	0-10	5-15	1.30-1.45	0.6-2.0	0.14-0.20	3.6-5.5	Low----------	0.37	4	.5-1
	10-48	35-50	1.45-1.60	0.2-0.6	0.12-0.19	3.6-5.5	Moderate-----	0.28		
	48-72	5-30	1.30-1.50	0.6-6.0	0.05-0.14	3.6-5.5	Low----------	0.17		
HeB---------- Helena	0-12	5-20	1.58-1.62	2.0-6.0	0.10-0.12	4.5-6.0	Low----------	0.15	3	.5-2
	12-16	20-35	1.46-1.56	0.2-0.6	0.13-0.15	4.5-5.5	Moderate-----	0.28		
	16-42	35-60	1.44-1.55	0.06-0.2	0.13-0.15	4.5-5.5	High----------	0.28		
	42-60	---	---	---	---	---	----------	----		
HwB, HwD--------- Hiwassee	0-10	10-35	1.35-1.55	0.6-2.0	0.12-0.15	4.5-6.0	Low----------	0.28	5	.5-2
	10-64	35-60	1.30-1.45	0.6-2.0	0.12-0.15	4.5-6.0	Moderate-----	0.28		
	64-80	7-35	1.45-1.65	0.6-2.0	0.10-0.14	4.5-6.0	Low----------	0.28		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
IrB, IrD--------- Iredell	0-8	10-20	1.30-1.70	2.0-6.0	0.12-0.15	6.0-7.3	Low----------	0.28	3	.5-2
	8-25	40-60	1.20-1.50	0.06-0.2	0.16-0.22	6.1-7.3	Very high----	0.20		
	25-28	15-35	1.30-1.60	0.06-0.2	0.14-0.18	6.1-7.8	High----------	0.28		
	28-60	---	---	---	---	---	----------	----		
LeB---------- Leaksville	0-9	10-30	1.35-1.50	0.6-2.0	0.14-0.20	5.1-6.5	Low----------	0.43	3	.5-2
	9-18	35-65	1.30-1.45	0.06-0.2	0.12-0.18	6.1-7.8	High----------	0.24		
	18-24	10-40	1.35-1.50	0.2-0.6	0.12-0.20	6.1-7.8	Moderate------	0.24		
	24-30	---	---	---	---	---	----------	----		
	30	---	---	---	---	---	----------	----		
LkB*:										
Leaksville------	0-9	10-30	1.35-1.50	0.6-2.0	0.14-0.20	5.1-6.5	Low----------	0.43	3	.5-2
	9-18	35-65	1.30-1.45	0.06-0.2	0.12-0.18	6.1-7.8	High----------	0.24		
	18-24	10-40	1.35-1.50	0.2-0.6	0.12-0.20	6.1-7.8	Moderate------	0.24		
	24-30	---	---	---	---	---	----------	----		
	30	---	---	---	---	---	----------	----		
Urban land.										
MaD, MaE--------- Madison	0-8	5-15	1.45-1.65	2.0-6.0	0.11-0.15	4.5-6.0	Low----------	0.24	4	.5-2
	8-25	30-50	1.20-1.40	0.6-2.0	0.13-0.18	4.5-5.5	Low----------	0.32		
	25-31	25-35	1.30-1.40	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.28		
	31-60	---	---	---	---	---	----------	----		
MbB2, MbD2, MbE2- Madison	0-8	25-35	1.30-1.40	0.6-2.0	0.12-0.16	4.5-6.0	Low----------	0.28	4	.5-2
	8-25	30-50	1.20-1.40	0.6-2.0	0.13-0.18	4.5-5.5	Low----------	0.32		
	25-31	25-35	1.30-1.40	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.28		
	31-60	---	---	---	---	---	----------	----		
McC2*:										
Madison---------	0-8	25-35	1.30-1.40	0.6-2.0	0.12-0.16	4.5-6.0	Low----------	0.28	4	.5-2
	8-25	30-50	1.20-1.40	0.6-2.0	0.13-0.18	4.5-5.5	Low----------	0.32		
	25-31	25-35	1.30-1.40	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.28		
	31-60	---	---	---	---	---	----------	----		
Udorthents.										
MdB, MdD, MdE---- Mayodan	0-7	5-20	1.40-1.65	0.6-2.0	0.11-0.17	4.5-6.0	Low----------	0.24	4	.5-2
	7-50	35-60	1.25-1.45	0.6-2.0	0.12-0.18	4.5-5.5	Moderate------	0.28		
	50-72	---	---	---	0.02-0.06	4.5-5.5	Low----------	----		
MeB2, MeD2, MeE2- Mayodan	0-7	20-30	1.35-1.45	0.6-2.0	0.12-0.22	4.5-6.0	Low----------	0.32	3	.5-2
	7-50	35-60	1.25-1.45	0.6-2.0	0.12-0.18	4.5-5.5	Moderate------	0.28		
	50-72	---	---	---	0.02-0.06	4.5-5.5	Low----------	----		
MfC*:										
Mayodan---------	0-7	5-20	1.40-1.65	0.6-2.0	0.11-0.17	4.5-6.0	Low----------	0.24	4	.5-2
	7-50	35-60	1.25-1.45	0.6-2.0	0.12-0.18	4.5-5.5	Moderate------	0.28		
	50-72	---	---	---	0.02-0.06	4.5-5.5	Low----------	----		
Urban land.										
MkB2---------- Mecklenburg	0-7	20-35	1.40-1.60	0.6-2.0	0.12-0.14	5.6-7.3	Low----------	0.28	2	.5-1
	7-22	40-60	1.40-1.60	0.06-0.2	0.12-0.14	5.6-7.3	Moderate------	0.28		
	22-30	20-35	1.40-1.60	0.6-2.0	0.12-0.14	5.6-7.3	Low----------	0.32		
	30-72	---	---	---	---	---	----------	----		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
PaD, PaE, PaF---- Pacolet	0-6	8-20	1.00-1.50	2.0-6.0	0.08-0.12	4.5-6.5	Low----------	0.20	3	.5-2
	6-25	35-65	1.30-1.50	0.6-2.0	0.12-0.15	4.5-5.5	Low----------	0.28		
	25-35	15-30	1.20-1.50	0.6-2.0	0.08-0.15	4.5-5.5	Low----------	0.28		
	35-60	10-25	1.20-1.50	0.6-2.0	0.08-0.15	4.5-5.5	Low----------	0.28		
PcD2, PcE2------- Pacolet	0-6	20-35	1.30-1.50	0.6-2.0	0.10-0.14	4.5-6.5	Low----------	0.24	2	.5-1
	6-25	35-65	1.30-1.50	0.6-2.0	0.12-0.15	4.5-5.5	Low----------	0.28		
	25-35	15-30	1.20-1.50	0.6-2.0	0.08-0.15	4.5-5.5	Low----------	0.28		
	35-60	10-25	1.20-1.50	0.6-2.0	0.08-0.15	4.5-5.5	Low----------	0.28		
PnC, PnF--------- Pinkston	0-5	5-18	1.20-1.40	2.0-6.0	0.10-0.15	4.5-5.5	Low----------	0.32	2	.5-2
	5-16	10-18	1.20-1.50	2.0-6.0	0.06-0.18	4.5-5.5	Low----------	0.24		
	16-23	10-20	1.20-1.50	2.0-6.0	0.05-0.16	4.5-5.5	Low----------	0.24		
	23	---	---	---	---	---	----------	----		
Pt*, Qu*. Pits										
RnB, RnD, RnE---- Rion	0-10	5-20	1.30-1.50	2.0-6.0	0.08-0.12	4.5-6.5	Low----------	0.24	3	.5-2
	10-34	18-35	1.40-1.50	0.6-2.0	0.08-0.15	4.5-6.5	Low----------	0.20		
	34-60	2-20	1.30-1.50	2.0-6.0	0.06-0.12	4.5-6.5	Low----------	0.20		
RoC*:										
Rion----------	0-10	5-20	1.30-1.50	2.0-6.0	0.08-0.12	4.5-6.5	Low----------	0.24	3	.5-2
	10-34	18-35	1.40-1.50	0.6-2.0	0.08-0.15	4.5-6.5	Low----------	0.20		
	34-60	2-20	1.30-1.50	2.0-6.0	0.06-0.12	4.5-6.5	Low----------	0.20		
Urban land.										
SeB---------- Sedgefield	0-4	8-20	1.50-1.65	2.0-6.0	0.10-0.14	4.5-6.5	Low----------	0.28	3	.5-2
	4-35	35-60	1.25-1.40	0.06-0.2	0.14-0.18	4.5-6.5	High----------	0.28		
	35-60	---	---	---	---	---	----------	----		
SpB---------- Spray	0-6	20-35	1.30-1.45	0.6-2.0	0.15-0.20	4.5-5.5	Low----------	0.43	4	1-2
	6-17	35-60	1.25-1.40	0.6-2.0	0.13-0.18	5.1-6.5	Moderate-----	0.28		
	17-60	---	---	---	---	---	----------	----		
SuB*:										
Spray----------	0-6	20-35	1.30-1.45	0.6-2.0	0.15-0.20	4.5-5.5	Low----------	0.43	4	1-2
	6-17	35-60	1.25-1.40	0.6-2.0	0.13-0.18	5.1-6.5	Moderate-----	0.28		
	17-60	---	---	---	---	---	----------	----		
Urban land.										
SvB, SvD, SvE---- Stoneville	0-5	7-30	1.35-1.55	0.6-2.0	0.14-0.20	4.5-6.0	Low----------	0.32	5	.5-2
	5-13	7-35	1.30-1.45	0.6-2.0	0.14-0.20	4.5-6.0	Low----------	0.32		
	13-38	35-60	1.25-1.40	0.6-2.0	0.14-0.20	4.5-6.0	Moderate-----	0.28		
	38-48	10-35	1.30-1.45	0.6-2.0	0.14-0.20	4.5-6.0	Low----------	0.24		
	48-72	---	---	---	---	---	----------	----		
SwC*:										
Stoneville------	0-5	7-30	1.35-1.55	0.6-2.0	0.14-0.20	4.5-6.0	Low----------	0.32	5	.5-2
	5-13	7-35	1.30-1.45	0.6-2.0	0.14-0.20	4.5-6.0	Low----------	0.32		
	13-38	35-60	1.25-1.40	0.6-2.0	0.14-0.20	4.5-6.0	Moderate-----	0.28		
	38-48	10-35	1.30-1.45	0.6-2.0	0.14-0.20	4.5-6.0	Low----------	0.24		
	48-72	---	---	---	---	---	----------	----		
Urban land.										

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
Ud*. Udorthents										
Ur*. Urban land										
VaB, VaD--------- Vance	0-8	8-20	1.45-1.70	2.0-6.0	0.10-0.14	4.5-6.0	Low----------	0.24	4	.5-2
	8-36	35-60	1.25-1.40	0.06-0.2	0.12-0.15	4.5-5.5	Moderate-----	0.28		
	36-60	---	---	---	---	---	----------	----		
WaD---------- Wateree	0-10	5-18	1.40-1.60	2.0-6.0	0.08-0.12	4.5-6.0	Low----------	0.20	3	<1
	10-22	5-18	1.30-1.60	2.0-6.0	0.08-0.12	4.5-6.0	Low----------	0.20		
	22-25	2-15	1.40-1.70	2.0-6.0	0.04-0.12	3.6-6.0	Low----------	0.17		
	25-60	---	---	---	---	---	----------	----		
WaF---------- Wateree	0-10	2-15	1.40-1.70	2.0-6.0	0.06-0.08	4.5-6.0	Low----------	0.15	3	<1
	10-22	5-18	1.30-1.60	2.0-6.0	0.08-0.12	4.5-6.0	Low----------	0.20		
	22-25	2-15	1.40-1.70	2.0-6.0	0.04-0.12	4.5-6.0	Low----------	0.17		
	25-60	---	---	---	---	---	----------	----		
We---------- Wehadkee	0-7	15-40	1.35-1.50	0.6-2.0	0.15-0.24	4.5-6.5	Low----------	0.32	5	2-5
	7-47	18-35	1.30-1.50	0.6-2.0	0.16-0.20	4.5-6.5	Low----------	0.32		
	47-60	---	---	---	---	---	----------	----		
WhB---------- Wickham	0-12	8-15	1.45-1.65	2.0-6.0	0.11-0.16	5.1-6.0	Low----------	0.24	5	.5-2
	12-50	18-25	1.30-1.40	0.6-2.0	0.12-0.17	5.1-6.0	Low----------	0.24		
	50-60	---	---	---	---	---	----------	----		
WkC, WkF--------- Wilkes	0-7	5-20	1.30-1.50	2.0-6.0	0.11-0.15	5.1-6.5	Low----------	0.24	2	.5-2
	7-15	20-40	1.40-1.60	0.2-0.6	0.15-0.20	5.1-7.8	Moderate-----	0.32		
	15-60	---	---	---	---	---	----------	----		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "frequent," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
ApB, ApD---------- Appling	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
AyC, AyF---------- Ayersville	B	None--------	---	---	>6.0	---	---	20-40	Hard	Low------	High.
CcB, CdB2--------- Cecil	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
CeC*:											
Cecil----------	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Urban land.											
Ch---------- Chastain	D	Frequent----	Very long	Dec-Apr	0-1.0	Apparent	Nov-May	>60	---	High-----	High.
Ck---------- Chewacla	C	Frequent----	Brief-----	Nov-Apr	0.5-1.5	Apparent	Nov-Apr	>60	---	High-----	Moderate.
Co---------- Congaree	B	Frequent----	Brief-----	Nov-Apr	2.5-4.0	Apparent	Nov-Apr	>60	---	Moderate	Moderate.
CrB---------- Creedmoor	C	None--------	---	---	1.5-2.0	Perched	Jan-Mar	>60	---	High-----	High.
DoB---------- Dogue	C	None--------	---	---	1.5-3.0	Apparent	Jan-Mar	>60	---	High-----	High.
HeB---------- Helena	C	None--------	---	---	1.5-2.5	Perched	Jan-Apr	>48	Soft	High-----	High.
HwB, HwD---------- Hiwassee	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
IrB, IrD---------- Iredell	C/D	None--------	---	---	1.0-2.0	Perched	Dec-Apr	>60	---	High-----	Low.
LeB---------- Leaksville	D	None--------	---	---	0-2.0	Perched	Dec-Mar	24-60	Hard	Moderate	Low.
LkB*:											
Leaksville-------	D	None--------	---	---	0-2.0	Perched	Dec-Mar	24-60	Hard	Moderate	Low.
Urban land.											
MaD, MaE, MbB2, MbD2, MbE2------- Madison	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
McC2*:											
Madison----------	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
Udorthents.											

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hardness	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In			
MdB, MdD, MdE, MeB2, MeD2, MeE2-Mayodan	B	None	---	---	>6.0	---	---	>60	---	High	Moderate.
MfC*:											
Mayodan	B	None	---	---	>6.0	---	---	>60	---	High	Moderate.
Urban land.											
MkB2-Mecklenburg	C	None	---	---	>6.0	---	---	48-60	Soft	High	Moderate.
PaD, PaE, PaF, PcD2, PcE2-Pacolet	B	None	---	---	>6.0	---	---	>60	---	High	High.
PnC, PnF-Pinkston	B	None	---	---	>6.0	---	---	20-40	Hard	Low	High.
Pt*, Qu*. Pits											
RnB, RnD, RnE-Rion	B	None	---	---	>6.0	---	---	>60	---	Moderate	High.
RoC*:											
Rion	B	None	---	---	>6.0	---	---	>60	---	Moderate	High.
Urban land.											
SeB-Sedgefield	C	None	---	---	1.0-1.5	Perched	Jan-Mar	>48	Soft	High	Moderate.
SpB-Spray	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
SuB*:											
Spray	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Urban land.											
SvB, SvD, SvE-Stoneville	B	None	---	---	>6.0	---	---	40-60	Soft	High	High.
SwC*:											
Stoneville	B	None	---	---	>6.0	---	---	40-60	Soft	High	High.
Urban land.											
Ud*. Udorthents											
Ur*. Urban land											
VaB, VaD-Vance	C	None	---	---	>6.0	---	---	>60	---	High	High.
WaD, WaF-Wateree	B	None	---	---	>6.0	---	---	20-40	Soft	Low	High.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
We---------- Wehadkee	D	Frequent----	Brief-----	Nov-Jun	0-2.5	Apparent	Dec-May	>60	---	High-----	Moderate.
WhB---------- Wickham	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
WkC, WkF---------- Wilkes	C	None--------	---	---	>6.0	---	---	<20	Soft	Moderate	Moderate.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--ENGINEERING INDEX TEST DATA

(Dashes indicate that data were not available. NP means nonplastic. The soils are the typical pedons for the soil series in the survey area unless otherwise noted. For the location of the pedons, see "Soil Series and Their Morphology" or refer to the footnote location)

Soil name, report number, horizon, and depth in inches	Classification		Grain-size distribution										Liquid limit	Plas-ticity index	Moisture density	
			Percentage passing sieve--						Percentage smaller than--						Maximum dry density	Optimum moisture
	AASHTO	Unified	3/8 inch	No. 4	No. 10	No. 40	No. 60	No. 200	.05 mm	.02 mm	.005 mm	.002 mm				
													Pct		Lb/cu ft	Pct
Ayersville gravelly loam*: (S78NC-157-10)																
Ap----------0 to 8	A-6(3)	SC	98	95	95	66	60	47	44	38	20	11	36	11	99.3	22.1
Bw----------8 to 22	A-4(7)	ML	100	100	100	88	83	69	66	61	42	26	38	10	99.7	23.7
C----------22 to 26	A-4(2)	ML	100	100	100	84	75	54	49	43	27	17	34	7	103.1	21.1
Hiwassee loam: (S78NC-157-3)																
Ap----------0 to 10	A-6(6)	CL	100	100	100	94	85	59	54	45	32	23	32	15	108.1	16.9
Bt2----------31 to 52	A-7-6(15)	CL	100	100	99	95	88	66	61	57	50	45	46	26	105.0	19.2
C----------64 to 80	A-6(7)	CL	100	99	99	96	84	53	48	44	40	37	40	19	110.4	16.9
Leaksville silt loam: (S78NC-157-4)																
Ap----------0 to 6	A-6(8)	ML	99	96	91	79	78	72	70	62	26	12	38	12	100.5	20.6
Btg----------9 to 18	A-7-6(34)	CH	98	94	92	83	82	79	77	72	55	41	65	41	98.1	23.4
Mayodan sandy clay loam: (S78NC-157-7)																
Ap----------0 to 7	A-6(6)	CL	100	100	99	94	86	59	54	45	36	29	32	14	111.4	16.3
Bt2----------24 to 38	A-7-5(39)	CH	100	100	100	99	98	83	78	70	57	52	73	41	91.3	28.5
C----------50 to 72	A-6(3)	SM	100	100	100	98	87	45	40	32	24	19	40	12	98.7	98.7
Pinkston fine sandy loam*: (S78NC-157-11)																
A----------0 to 5	A-4(4)	ML	98	97	96	86	82	63	49	36	21	11	35	8	104.6	18.1
Bw----------5 to 16	A-4(0)	CL-ML	100	100	99	92	86	53	44	34	19	13	25	5	118.2	13.0
C----------16 to 23	A-4(0)	SM	99	98	98	93	81	36	31	23	13	9	---	NP	115.8	13.4

See footnotes at end of table.

TABLE 17.--ENGINEERING INDEX TEST DATA--Continued

Soil name, report number, horizon, and depth in inches	Classification		Grain-size distribution										Liquid limit	Plas-ticity index	Moisture density	
			Percentage passing sieve--						Percentage smaller than--						Maximum dry density	Optimum moisture
	AASHTO	Unified	3/8 inch	No. 4	No. 10	No. 40	No. 60	No. 200	.05 mm	.02 mm	.005 mm	.002 mm				
													Pct		Lb/cu ft	Pct
Spray loam*: (S78NC-157-5)																
Ap---------- 0 to 6	A-7-5(8)	ML	100	100	99	83	79	70	68	62	37	20	41	11	97.1	23.2
Bt----------6 to 17	A-7-6(14)	CL	100	98	98	81	77	70	70	66	47	34	48	21	96.5	24.3
C----------17 to 60	A-7-5(4)	SM	100	100	100	63	53	41	40	37	23	13	56	20	86.7	32.0
Stoneville loam**: (S78NC-157-8)																
A----------0 to 6	A-6(13)	ML	100	100	99	95	93	87	82	67	36	21	40	14	99.3	21.5
Bt2----------18 to 40	A-7-6(45)	CH	100	100	100	98	97	94	91	87	70	60	68	42	100.2	23.5

* Results of this test show less material retained on the 3/8 inch, No. 4, and No. 10 sieves than is typical for this soil. Due to the soft nature of the coarse fragments, they were probably crushed during preparation of the samples.

** Stoneville loam, 0.5 mile northeast of Mayodan on Secondary Road 2168; 1.0 mile northeast of the intersection of Secondary Road 2168 and North Carolina Highway 135; 100 feet west of Secondary Road 2168, in a wooded area.

TABLE 18.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Appling	Clayey, kaolinitic, thermic Typic Kanhapludults
Ayersville	Fine-loamy, mixed, thermic Umbric Dystrochrepts
Cecil	Clayey, kaolinitic, thermic Typic Kanhapludults
*Chastain	Fine, mixed, acid, thermic Typic Fluvaquents
Chewacla	Fine-loamy, mixed, thermic Fluvaquentic Dystrochrepts
Congaree	Fine-loamy, mixed, nonacid, thermic Typic Udifluvents
Creedmoor	Clayey, mixed, thermic Aquic Hapludults
Dogue	Clayey, mixed, thermic Aquic Hapludults
Helena	Clayey, mixed, thermic Aquic Hapludults
Hiwassee	Clayey, kaolinitic, thermic Rhodic Kanhapludults
Iredell	Fine, montmorillonitic, thermic Typic Hapludalfs
Leaksville	Fine, montmorillonitic, thermic Typic Albaqualfs
Madison	Clayey, kaolinitic, thermic Typic Kanhapludults
Mayodan	Clayey, mixed, thermic Typic Hapludults
Mecklenburg	Fine, mixed, thermic Ultic Hapludalfs
Pacolet	Clayey, kaolinitic, thermic Typic Kanhapludults
Pinkston	Coarse-loamy, mixed, thermic Ruptic-Ultic Dystrochrepts
Rion	Fine-loamy, mixed, thermic Typic Hapludults
Sedgefield	Fine, mixed, thermic Aquultic Hapludalfs
Spray	Fine, mixed, thermic Ultic Hapludalfs
Stoneville	Clayey, mixed, thermic Typic Rhodudults
Udorthents	Loamy, mixed, thermic Typic Udorthents
Vance	Clayey, mixed, thermic Typic Hapludults
Wateree	Coarse-loamy, mixed, thermic Typic Dystrochrepts
Wehadkee	Fine-loamy, mixed, nonacid, thermic Typic Fluvaquents
Wickham	Fine-loamy, mixed, thermic Typic Hapludults
Wilkes	Loamy, mixed, thermic, shallow Typic Hapludalfs

* The soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series.

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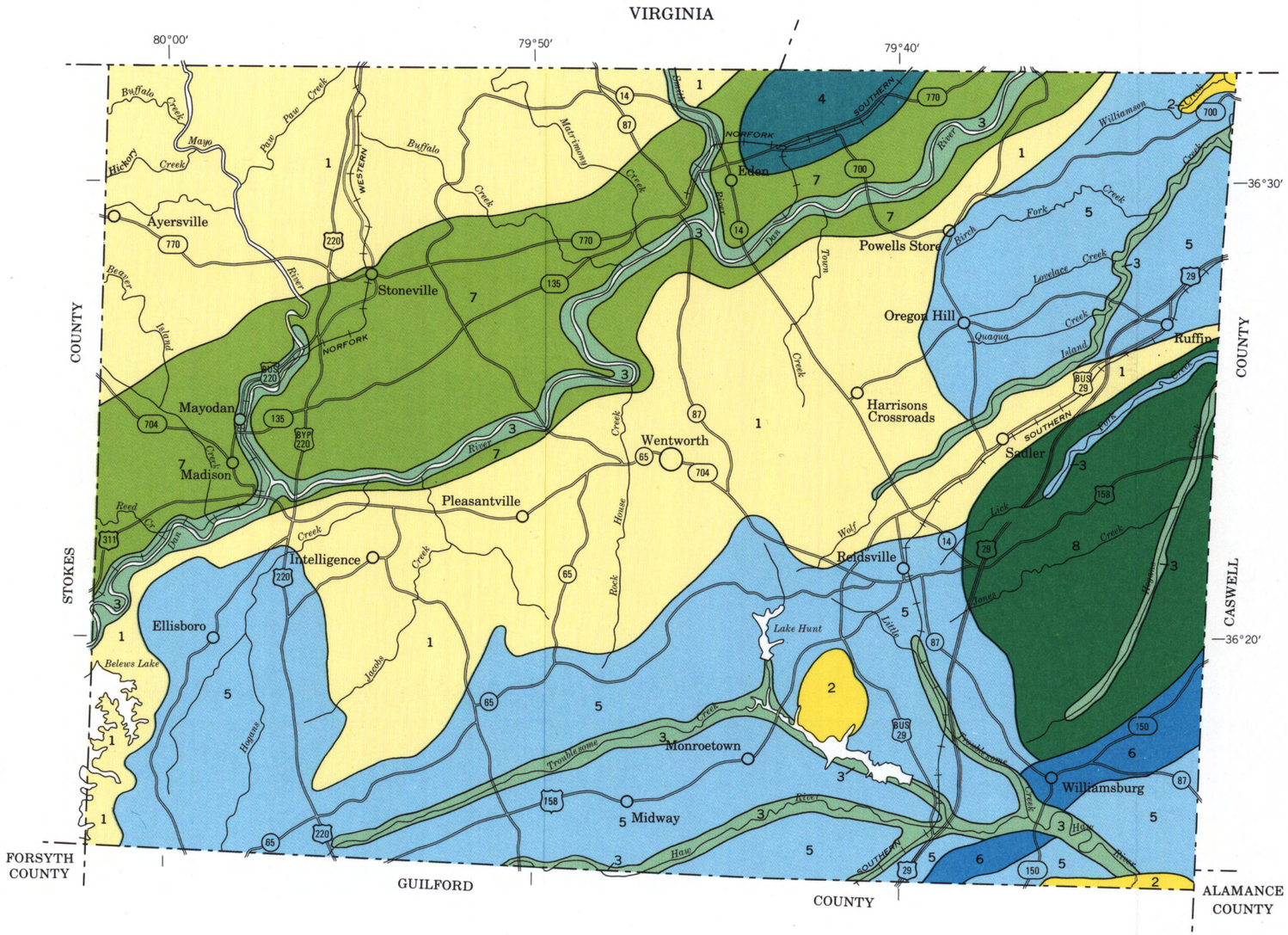


SOIL LEGEND

1 — PACOLET-MADISON-CECIL: Gently sloping to steep, deep, well drained soils that have a loamy surface layer and a loamy and clayey subsoil; on uplands

2 — IREDELL-MECKLENBURG: Gently sloping to strongly sloping, deep, well drained to somewhat poorly drained soils that have a loamy surface layer and a clayey and loamy subsoil; on uplands

3 — CHEWACLA-CONGAREE-WEHADKEE: Nearly level, deep, well drained to poorly drained soils that have a loamy surface layer and subsoil; on flood plains

4 — LEAKSVILLE-SPRAY-AYERSVILLE: Nearly level to steep, moderately deep and deep soils that are somewhat poorly drained or poorly drained or are excessively drained to well drained and that have a loamy surface layer and a loamy or clayey subsoil; on uplands

5 — CECIL-PACOLET-APPLING: Gently sloping to steep, deep, well drained soils that have a loamy surface layer and a loamy and clayey subsoil; on uplands

6 — VANCE-CECIL-HELENA: Gently sloping to strongly sloping, deep, well drained and moderately well drained soils that have a loamy surface layer and a loamy and clayey subsoil; on uplands

7 — MAYODAN-STONEVILLE: Gently sloping to moderately steep, deep, well drained soils that have a loamy surface layer and a loamy and clayey subsoil; on uplands

8 — PACOLET-WILKES: Gently sloping to steep, deep and shallow, well drained soils that have a loamy surface layer and a loamy and clayey subsoil; on uplands

Compiled 1989

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

N

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
NORTH CAROLINA AGRICULTURAL RESEARCH SERVICE
NORTH CAROLINA AGRICULTURAL EXTENSION SERVICE
ROCKINGHAM COUNTY BOARD OF COMMISSIONERS

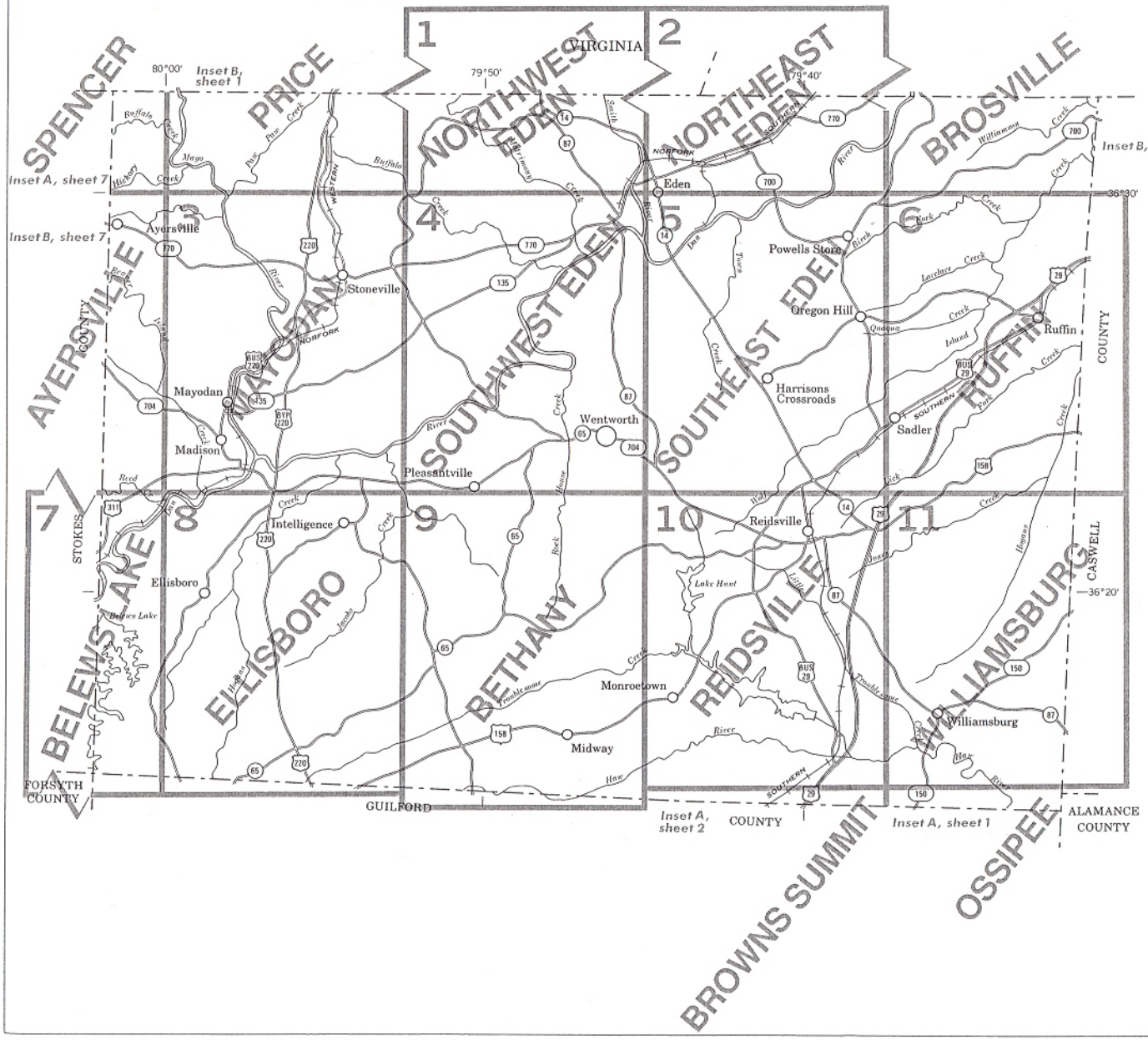
GENERAL SOIL MAP

ROCKINGHAM COUNTY, NORTH CAROLINA

Scale 1:190,080

1 0 1 2 3 Miles

1 0 3 6 Km



INDEX TO MAP SHEETS

ROCKINGHAM COUNTY, NORTH CAROLINA

Scale 1:190,080

1 0 1 2 3 Miles

1 0 3 6 Km

SOIL LEGEND

Map symbols consist of a combination of letters or of letters and a number. The first capital letter is the initial one of the map unit name. The lower case letter that follows separates map units having names that begin with the same letter, except that it does not separate sloping or eroded phases. The second capital letter indicates the class of slope. Symbols without a slope letter are for nearly level soils or miscellaneous areas. A final number of 2 indicates that the soil is eroded.

SYMBOL	NAME
ApB	Appling sandy loam, 2 to 8 percent slopes
ApD	Appling sandy loam, 8 to 15 percent slopes
AyC	Ayersville gravelly loam, 4 to 15 percent slopes
AyF	Ayersville gravelly loam, 15 to 45 percent slopes
CcB	Cecil sandy loam, 2 to 8 percent slopes
CdB2	Cecil sandy clay loam, 2 to 8 percent slopes, eroded
CeC	Cecil-Urban land complex, 2 to 10 percent slopes
Ch	Chastain silty clay loam
Ck	Chewacla loam
Co	Congaree loam
CrB	Creedmoor fine sandy loam, 1 to 4 percent slopes
DoB	Dogue loam, 0 to 4 percent slopes
HeB	Helena sandy loam, 2 to 8 percent slopes
HwB	Hiwassee loam, 2 to 8 percent slopes
HwD	Hiwassee loam, 8 to 15 percent slopes
IrB	Iredell fine sandy loam, 2 to 8 percent slopes
Ird	Iredell fine sandy loam, 8 to 15 percent slopes
LeB	Leaksville silt loam, 0 to 4 percent slopes
LkB	Leaksville-Urban land complex, 0 to 4 percent slopes
MaD	Madison sandy loam, 8 to 15 percent slopes
MaE	Madison sandy loam, 15 to 35 percent slopes
MbB2	Madison sandy clay loam, 2 to 8 percent slopes, eroded
MbD2	Madison sandy clay loam, 8 to 15 percent slopes, eroded
MbE2	Madison sandy clay loam, 15 to 25 percent slopes, eroded
McC2	Madison-Udorthents complex, 2 to 15 percent slopes, gullied
MdB	Mayodan sandy loam, 2 to 8 percent slopes
MdD	Mayodan sandy loam, 8 to 15 percent slopes
MdE	Mayodan sandy loam, 15 to 25 percent slopes
MeB2	Mayodan sandy clay loam, 2 to 8 percent slopes, eroded
MeD2	Mayodan sandy clay loam, 8 to 15 percent slopes, eroded
MeE2	Mayodan sandy clay loam, 15 to 25 percent slopes, eroded
MfC	Mayodan-Urban land complex, 2 to 10 percent slopes
MkB2	Mecklenburg sandy clay loam, 2 to 8 percent slopes, eroded
PaD	Pacolet sandy loam, 8 to 15 percent slopes
PaE	Pacolet sandy loam, 15 to 25 percent slopes
PaF	Pacolet sandy loam, 25 to 40 percent slopes
PcD2	Pacolet sandy clay loam, 8 to 15 percent slopes, eroded
PcE2	Pacolet sandy clay loam, 15 to 25 percent slopes, eroded
PnC	Pinkston fine sandy loam, 6 to 15 percent slopes
PnF	Pinkston fine sandy loam, 15 to 45 percent slopes
Pt	Pits, Clay
Qu	Pits, Quarries
RnB	Rion sandy loam, 2 to 8 percent slopes
RnD	Rion sandy loam, 8 to 15 percent slopes
RnE	Rion sandy loam, 15 to 30 percent slopes
RoC	Rion-Urban land complex, 2 to 10 percent slopes
SeB	Sedgefield sandy loam, 2 to 8 percent slopes
SpB	Spray loam, 0 to 5 percent slopes
SuB	Spray-Urban land complex, 0 to 5 percent slopes
SvB	Stoneville loam, 2 to 8 percent slopes
SvD	Stoneville loam, 8 to 15 percent slopes
SvE	Stoneville loam, 15 to 25 percent slopes
SwC	Stoneville-Urban land complex, 2 to 10 percent slopes
Ud	Udorthents, loamy
Ur	Urban land
VaB	Vance sandy loam, 2 to 8 percent slopes
VaD	Vance sandy loam, 8 to 15 percent slopes
WaD	Wateree fine sandy loam, 6 to 15 percent slopes
WaF	Wateree fine sandy loam, 15 to 45 percent slopes
We	Wehadkee silt loam
WhB	Wickham sandy loam, 1 to 4 percent slopes
WkC	Wilkes sandy loam, 4 to 10 percent slopes
WkF	Wilkes sandy loam, 10 to 45 percent slopes

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline and neatline

AD HOC BOUNDARY (label) — Swift Airport

- Small airport, airfield, park, oilfield, cemetery, or flood pool — FLOOD POOL LINE

STATE COORDINATE TICK

LAND DIVISION CORNER (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate — 21
- Federal — 173
- State — 28
- County, farm or ranch — 1283

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or Small — water, w

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — Gas
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water, w
- Intermittent — int, i

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — RnB SvD

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

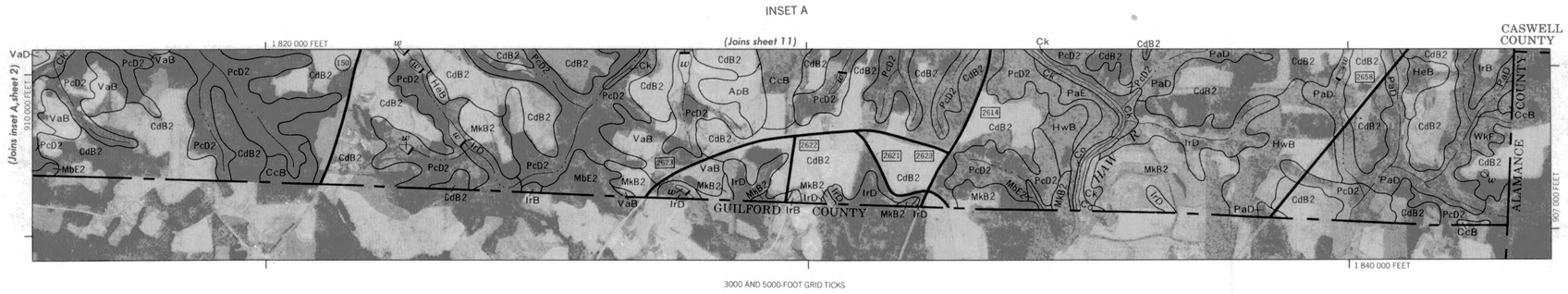
DEPRESSION OR SINK

SOIL SAMPLE (normally not shown) — S

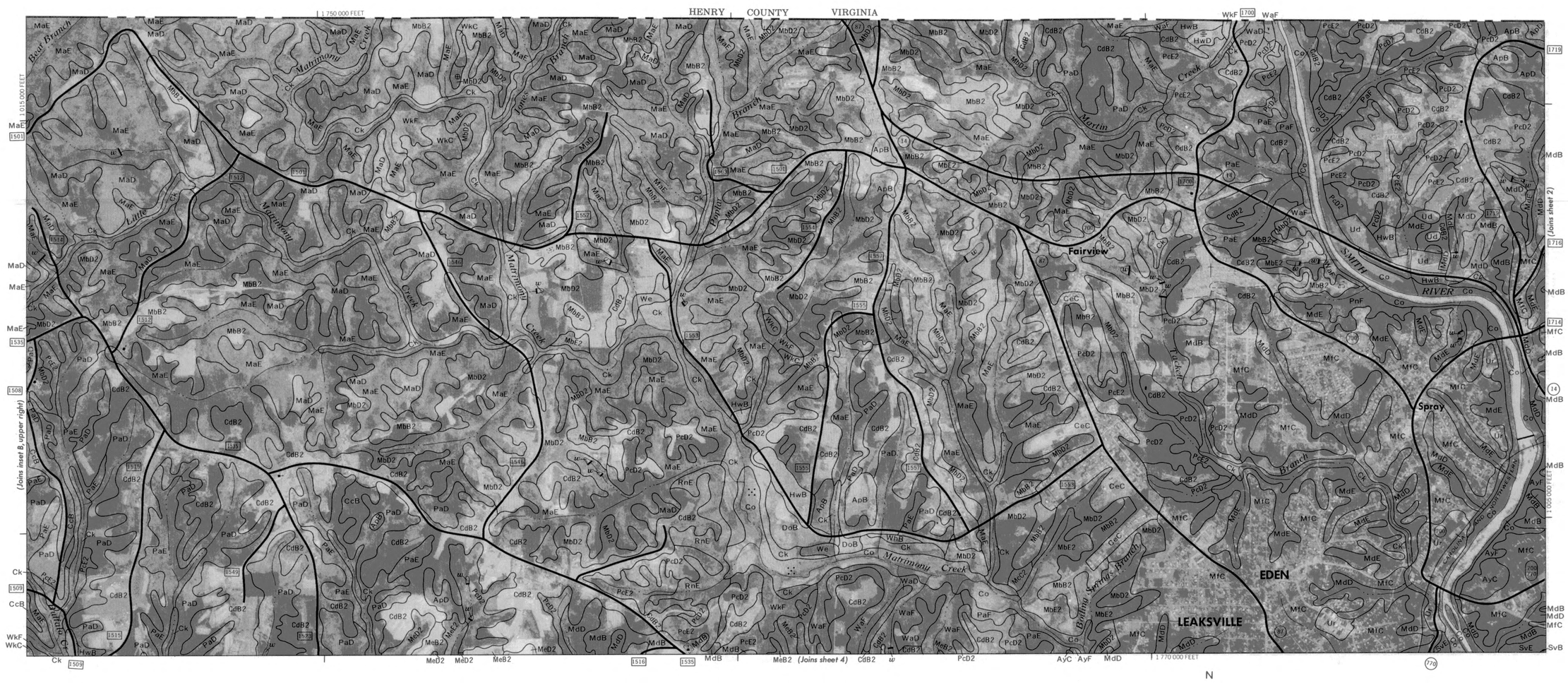
MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot
- Basic Intrusion
- Diabase Dike — Dd

INSET A



INSET B



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1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

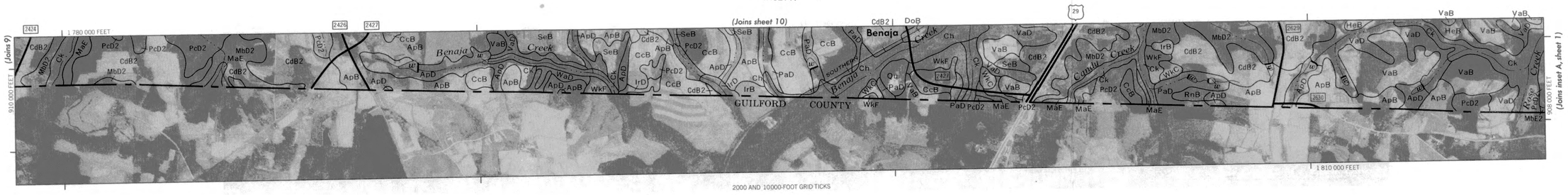
N

ROCKINGHAM COUNTY, NORTH CAROLINA NO. 1

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NUMBER 2
ROCKINGHAM COUNTY, NORTH CAROLINA

INSET A



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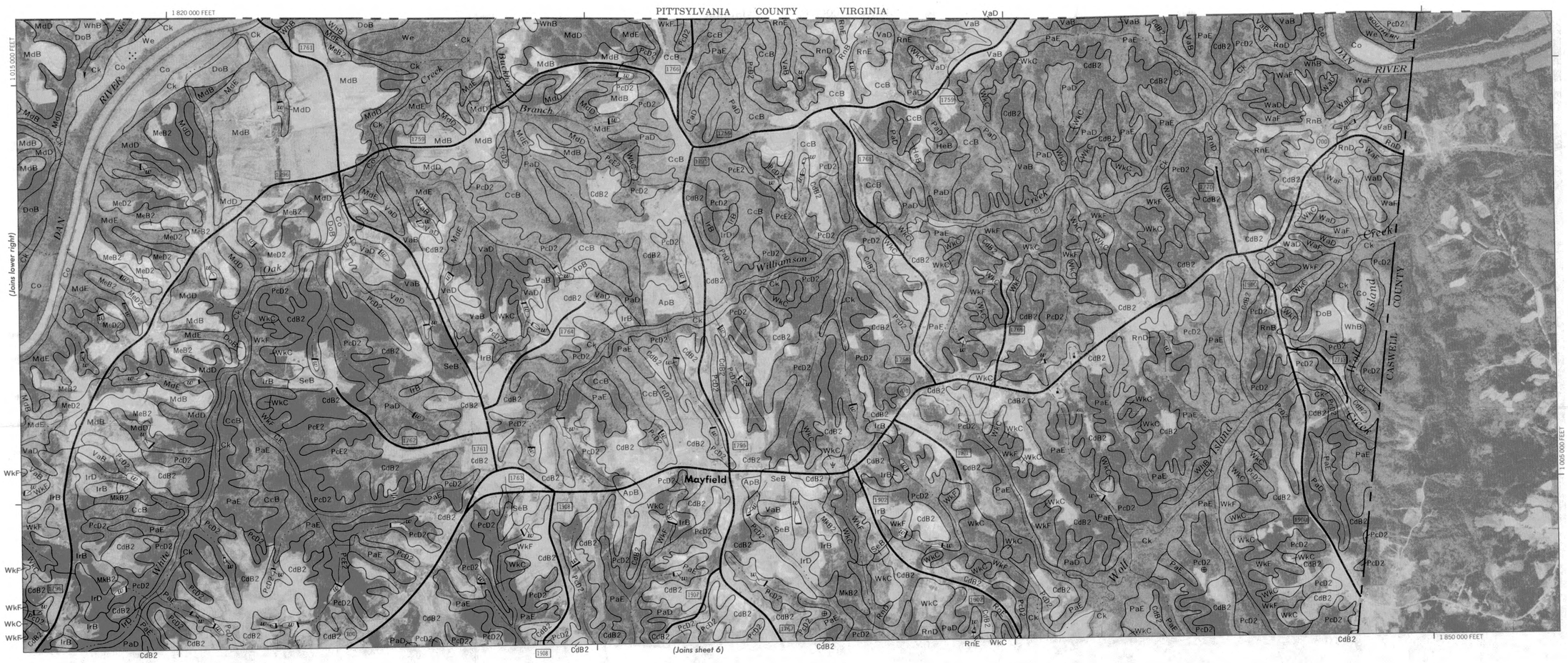

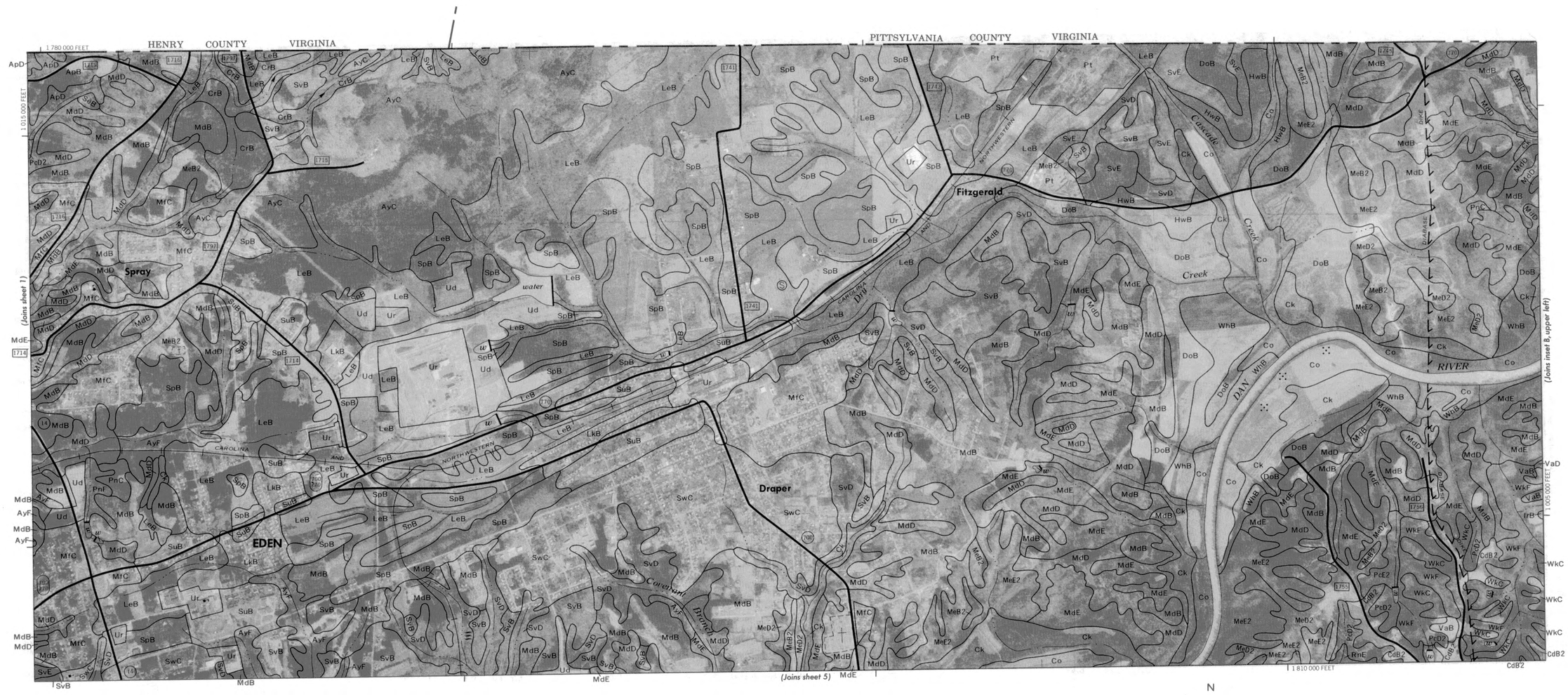

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1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

N

ROCKINGHAM COUNTY, NORTH CAROLINA NO. 2

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1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

N

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1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

N

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1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

N

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NUMBER 6
ROCKINGHAM COUNTY, NORTH CAROLINA

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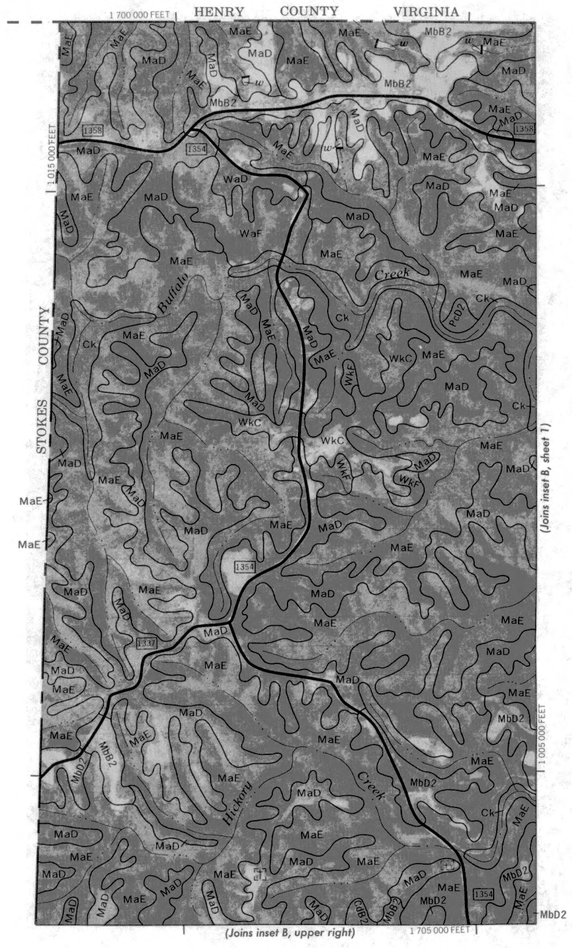
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

N

ROCKINGHAM COUNTY, NORTH CAROLINA NO. 6

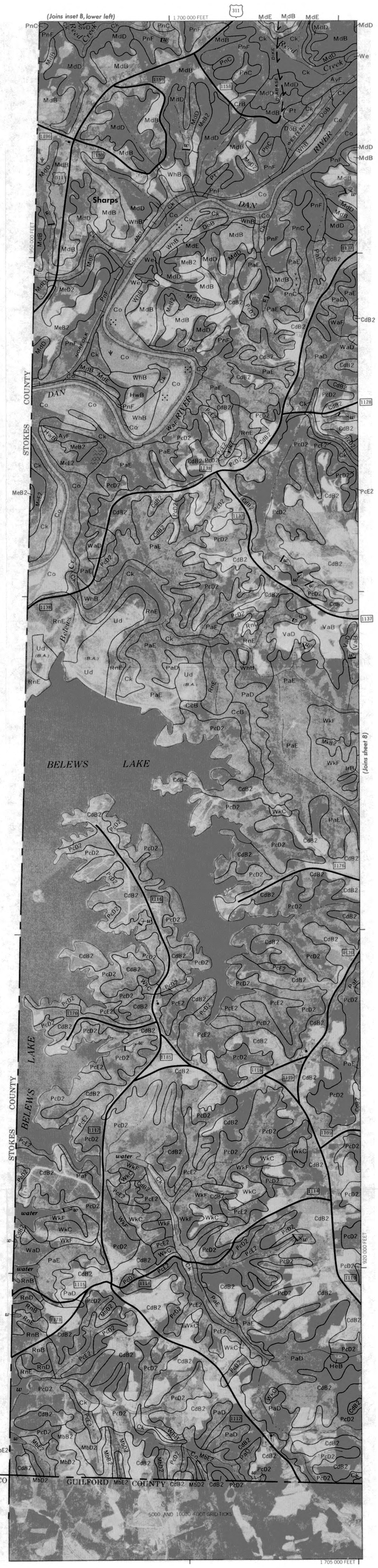
INSET A



5000 AND 10,000-FOOT GRID TICKS

INSET B

5000 AND 10 000-FOOT GRID TICKS



5000 AND 10000-FOOT GRID TICKS

1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

N

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U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NUMBER 8

ROCKINGHAM COUNTY, NORTH CAROLINA

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1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

N

ROCKINGHAM COUNTY, NORTH CAROLINA NO. 8

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

N

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1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

N

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1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

N